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FOREWORD

The Surveillance and Epidemiology Section of the Public Health Agency of Canada is pleased to provide you with the latest version of the Sexually Transmitted Infections (STI) Surveillance Report. This report summarizes trends in the three nationally notifiable bacterial STIs (genital chlamydia, gonorrhea and infectious syphilis) using data reported to the Public Health Agency of Canada by the provinces and territories. To provide a more complete picture of the burden of STIs in Canada, viral STI rates and the results of enhanced surveillance initiatives are included in the report. Finally, Canadian STI rates are given some context through a comparison with the rates of similar countries.

Although there have been efforts towards improving prevention, education and health promotion surrounding STIs in this country, clearly, transmission is not being controlled. Over 60,000 cases of genital chlamydia are reported every year in Canada, and young women are disproportionately affected, for many of whom infertility is a consequence. Syphilis and lymphogranuloma venereum have infected hundreds of Canadians so far, including a large proportion that are also infected with HIV. This is but one example of how many STIs increase the transmission and acquisition of HIV. The challenges faced in targeting the most vulnerable populations and a failure to properly educate our youth about sexual risks related to STIs adds further fuel to the fire.

In addition to the efforts made to avert new STI infections, STI prevention and control needs to be a key tool for preventing the spread of HIV. Investment in a comprehensive national strategy to address sexually transmitted and bloodborne infections will be needed to curb the escalating STI epidemic and save health care dollars downstream. Most importantly, efforts that result in averted infections and reduced morbidity will ultimately improve the health of Canadians.

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- the Sexual Health and Sexually Transmitted Infections Section through its thorough review of the document and valuable input and suggestions;
- other members of the Community Acquired Infections Division through their administrative and technical assistance;
- the Scientific Publications and Multimedia Services Division, PHAC, which edited and published the report;
- Dena Schanzer, who developed the projections;
- Janice Mann, who eloquently addressed the broad implications of rising chlamydia rates; and,
- the Public Health Library staff of Health Canada through their assistance with the literature review.

The ongoing national surveillance of sexually transmitted infections (STIs) requires the cooperation and commitment of many individuals and organizations:

- provincial and territorial ministries of health. We gratefully acknowledge them for the timely manner in which they provide data to the PHAC and their continued expert contributions to the national STI program;
- local public health units across the country with their continued commitment to collecting the data that form the basis of national surveillance;
- the Surveillance and Risk Assessment Division within the PHAC, which is responsible for national surveillance of HIV and AIDS and which maintains the Infectious Disease Reporting System from which counts of bacterial STI are derived;
- the National Microbiology Laboratory in Winnipeg, which provides data on antibiotic-resistant gonorrhea and also contributed to sections of this report; and
- the Field Surveillance Officers, located in several provinces and territories, who assist with data quality improvement and provide ongoing support to the Community Acquired Infections Division.

EXECUTIVE SUMMARY

This report confirms that sexually transmitted infections (STIs) are an escalating public health concern and challenge in Canada. Since 1997, reported rates of genital chlamydia and gonorrhea have been steadily increasing. Rates of infectious syphilis began to increase slowly in 1997 and then rose rapidly from 2000 onwards. As of 2004, all three reportable bacterial STIs are continuing their upward climb, affecting more and more Canadians.

The observed increase in the number of reported bacterial STI cases is not unique to Canada: there are some similarities between our country and both the United Kingdom and the United States in this respect. Chlamydia is the most commonly reported STI in each country, affecting similar age groups between the sexes, and it is on the rise. With respect to syphilis, a common epidemiologic factor among these countries is the occurrence of outbreaks among men who have sex with men (MSM). Unlike the first two infections, however, gonorrhea appears to be increasing only in Canada.

Genital chlamydia remains the most commonly reported STI and notifiable disease in Canada. The overall chlamydia rate in 2004 demonstrated a 70% increase from 1997; the rate of gonorrhea rose by 94%. Gonococcal resistance to first-line treatment options is an emerging problem. Infectious syphilis has seen the most staggering increase with a 9-fold rise in rates for this same period (Table 1).

The burden of STIs in Canada is not uniformly distributed throughout the population. Young women continue to be disproportionately affected by genital chlamydia, and gonorrhea infection is concentrated in males aged 20 to 29 years. Males over the age of 30 account for the majority of infectious syphilis cases. Marked geographic differences are also seen with rates of genital chlamydia and gonorrhea being highest in the north, followed by Manitoba and Saskatchewan. Infectious syphilis rates are highest in British Columbia. Ontario, not surprisingly given its large population, reports the greatest number of cases for all three notifiable STIs.

These three infections account for over half of all notifiable diseases reported to the Public Health Agency of Canada (Figure 1). This comparison paints a clear picture of the burden of disease directly attributable to STIs, which is further augmented by the significant morbidity and sequelae of some other sexually transmissible infections.

- Sexual transmission accounts for a significant proportion of reported cases of HIV. The number of positive test reports has remained relatively constant, at around 2,500 per year, with almost half of these diagnoses occurring in MSM.
- Human papillomavirus (HPV) and herpes simplex virus are both considered highly prevalent infections in the Canadian population. High-risk strains of HPV may cause abnormal

Table 1. Reported cases and rates of bacterial STIs in Canada

	Genital chlamydia		Gonorrhea		Infectious syphilis[1]	
	Cases	Rate[2]	Cases	Rate[2]	Cases	Rate[2]
1997	34,144	113.9	4,477	14.9	115	0.4
2002	56,266	179.4	7,365	23.5	482	1.5
2004[3]	62,971	197.1	9,233	28.9	1,127	3.5

[1] Infectious syphilis: primary, secondary and early latent stages

[2] Rate per 100,000 population

[3] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Pap smears in women, are the major cause of cervical cancer, and may lead to anogenital cancers in both men and women. Some non-oncogenic HPV strains may cause anogenital warts. The presence of herpetic ulcers facilitates the transmission of HIV.

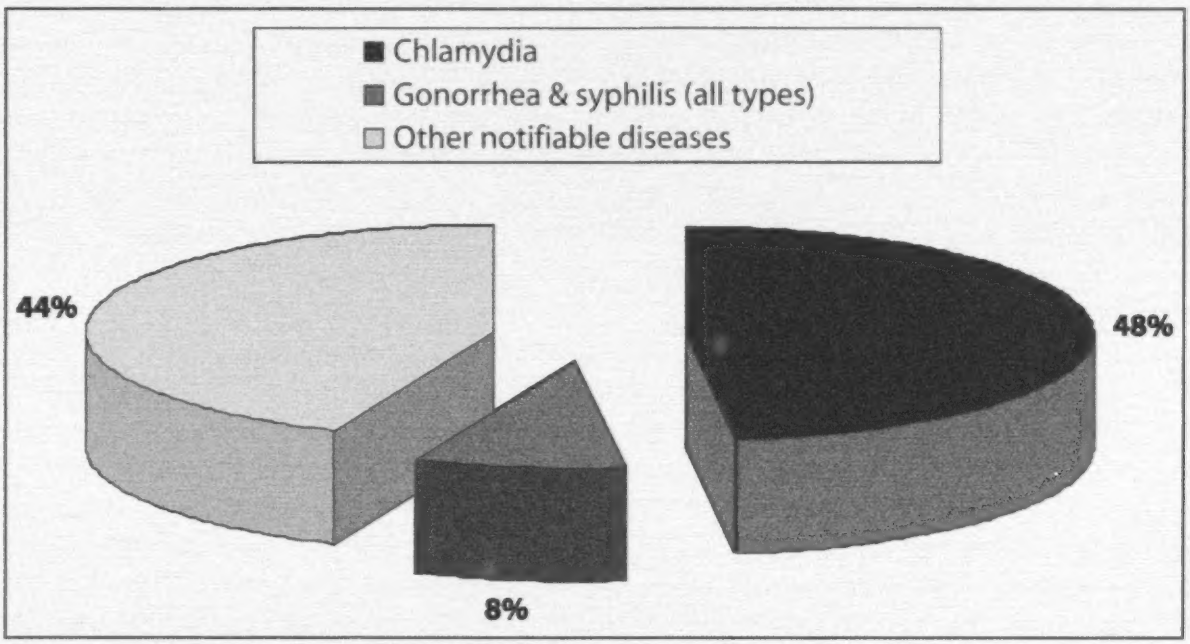
- Lymphogranuloma venereum, an emerging STI in Canada, may lead to significant sequelae. All reported cases have been male, with high rates of HIV co-infection.

Some high-risk populations may not be captured in routinely reported STI numbers. Enhanced surveillance initiatives provide an indication of the specific burden of disease in such populations, helping to guide prevention and control efforts. For example, the Enhanced Surveillance of Canadian Street Youth (E-SYS) demonstrates that street youth have much higher rates of bacterial STIs than youth in the general Canadian population.

Rates of chlamydia and gonorrhea were projected for the years 2005 to 2010 to provide a concrete example of what STI rates in Canada may look like in the absence of a substantive shift in the epidemic. If current trends persist, rates will reach even more daunting heights by the end of this decade. Since co-infection with multiple viral or bacterial STIs is common, especially in high-risk populations, factors that cut across infections need to be taken into consideration when developing public health interventions.

These figures have tangible implications for the Canadian population. An increasing proportion of the population is at risk of acquiring (or transmitting) an STI. The emotional and social consequences of a diagnosed infection may present significant challenges for an individual. The repercussions of an untreated infection may be even more serious, given that long-term health concerns may develop as a result. These infections are entirely preventable but are also easily diagnosed and treated. Factors such as these favour the control of STIs in Canada and must be used to our advantage as we look towards the future.

Figure 1. Reported cases of bacterial STI as a proportion of all notifiable diseases in Canada, 2004*



* 2004 numbers are preliminary and changes are anticipated; Nunavut data unavailable.

Source: Notifiable Diseases, Surveillance and Risk Assessment Division, Public Health Agency of Canada, 2006.

INTRODUCTION

This publication focuses on basic epidemiologic information about bacterial infections that are transmitted predominantly through sexual contact *and* that are nationally reportable to the Public Health Agency of Canada (PHAC). The list of nationally reportable diseases is determined by a federal/provincial/territorial committee using a priority-setting process to determine which diseases should be routinely monitored. Criteria were developed with the objective of establishing the most efficient allocation of resources in the prevention and control of diseases that pose a threat to Canadians. The sexually transmitted infections (STIs)[1] included on this list are genital chlamydia, gonorrhea and infectious syphilis. Other infections, such as genital herpes and human papillomavirus (HPV), are not nationally reportable. To provide a more complete picture of the burden of STIs in Canada, some non-reportable infections have been incorporated into this report, citing various research studies as a data source.

As the most commonly reported notifiable disease in Canada, chlamydia is responsible for a considerable proportion of the burden of disease. An invited commentary entitled "What If It All Means Something? The Consequences of High Rates of Chlamydia in Canada" further explores the implications of this seemingly innocuous and easily combatable bacterial infection.

This report on Canadian trends in STIs is intended for governments, health professionals, researchers and voluntary agencies that are involved in service provision and planning, as well as the general public. The goal is to provide information that can be used to support and guide decision-making and programs aimed at improving the health of Canadians. To further support this endeavour, a section projecting trends has been added.

Technical notes are provided to assist with data interpretation and to provide more detail on the surveillance system from which our data are extracted. The appendix contains data tables for each reportable STI and provides a breakdown of reported infection by age and sex, and province and sex.

All surveillance systems have limitations, and the following are those specifically noted for our system. Many STIs are asymptomatic, therefore some infections may go unnoticed, undiagnosed and unreported. Furthermore, contact tracing is a critical activity in the prevention and control of STIs, but recent increases in risky sexual behaviour, such as anonymous sex partnering, make contact tracing difficult. As a result, infections among anonymous contacts of cases may go unrecognized and therefore may not be captured by the surveillance system. Among symptomatic individuals, only those who seek testing or medical care will be counted. Because of these limitations, the counts in this report are likely an underestimate of the true burden of disease. However, the report does provide an estimate of the scope and trends of STIs in Canada over time. Data are subject to change as a result of reporting delays and other constraints common to surveillance systems.

When reading this report, please keep in mind that small variability may exist between data reported by the PHAC and data reported by individual provinces and territories. In such circumstances, provincial/territorial data are definitive, as these data are the most up to date.

1 The term STI (sexually transmitted infection), now commonly used in place of STD (sexually transmitted disease), is more encompassing and includes infections that may be asymptomatic.

EDITORIAL
What if it all means something? The consequences of high rates of chlamydia in Canada

Janice Mann, MD

This report clearly illustrates that the rates of reportable bacterial STIs in Canada are on the rise; of that, there is no question. However, in a world preoccupied with infectious disease issues, such as avian influenza and bioterrorism, do the rates of STIs really matter? Do we really need to concern ourselves with infections that can, for the most part, be easily and effectively treated? Why would we want to dedicate funds and resources to such a seemingly innocuous public health issue, when there are so many other potential public health threats requiring our attention? The truth is that STIs are anything but innocuous, and the threat they pose to the health and well being of Canadians is very real. STIs and their sequelae have a dramatic impact on the sexual, reproductive and overall health of Canadians and represent a substantial burden to our health care system.

While all bacterial STIs in Canada pose a significant health threat, genital chlamydia may represent one of the most serious. With its high and increasing prevalence, largely asymptomatic nature, multitude of long-term negative health outcomes and a startling lack of public awareness chlamydia is well positioned to wreak havoc on the health of Canadians, in particular young Canadian women.

Chlamydia trachomatis, the bacterium causing genital chlamydia infections, is the most prevalent sexually transmitted bacterial infection throughout the world, and the magnitude of morbidity associated with sexually transmitted chlamydial infections is enormous[1]. In Canada, genital chlamydia is the most commonly reported notifiable disease, despite the lack of symptoms in the vast majority of people infected (especially women). With no symptoms and a lack of chlamydia awareness, an overwhelming majority of people infected will not seek testing and treatment, and will therefore not be reported. In fact, it has been estimated that less than 10% of infections are actually diagnosed and treated, and subsequently reported[2]. Obviously the reported rates of chlamydia in Canada represent only the "tip of the iceberg" of the actual number of infections occurring.

Even the simplest manifestations of a *C. trachomatis* infection are potentially serious. *C. trachomatis* can infect the cervix (in women) or the urethra (in men and women) leading to mucopurulent cervicitis or urethritis respectively. Having a lower genital tract infection such as these can increase the risk of acquiring HIV through sexual contact. Those with both HIV and a genital chlamydial infection are more likely to transmit the HIV virus to an uninfected sexual partner. Infection during pregnancy can lead to a myriad of complications, including premature rupture of membranes, pre-term delivery, puerperal and neonatal infections, low birth weight and stillbirth[1] as well as early or repeated pregnancy loss[1,3]. *C. trachomatis* infection also appears to increase the risk of cervical cancer, perhaps acting as a co-factor along with causative oncogenic HPV strains[1,2].

The long-term complications of chlamydial infection are also of great concern. Over two-thirds of the nationally reported cases of genital chlamydia occur in Canadian youth and young adults between the ages of 15 and 24, in particular women.

Unfortunately, this over-represented group of female youth and young adults is most likely to suffer the most serious and lifelong consequences of the infection. These include pelvic inflammatory disease (PID), chronic pelvic pain, ectopic pregnancy and other adverse pregnancy outcomes, and infertility.

Pelvic Inflamatory Disease (PID)

PID is difficult to diagnose, is a challenge to treat effectively and is not well understood; furthermore, the public is largely unaware of its existence. How then, can PID be important to the health of Canadians, and why focus on PID in a discussion of rising rates of chlamydia?

PID is the single most important preventable cause of infertility and adverse pregnancy outcomes. PID occurs when organisms, primarily those acquired through sexual transmission (such as chlamydia and gonorrhea) or endogenous organisms, move from the lower to the upper genital tract infecting any combination of the uterus (endometrium), fallopian tubes and adjacent pelvic structures[1]. *C. trachomatis* is the major cause of PID. Between 10% and 40% of untreated cases of chlamydia will develop into PID. In turn, PID can lead to scarring, obstruction and damage to the fallopian tubes, causing tubal factor infertility, ectopic pregnancy (or other adverse pregnancy outcomes) and chronic pelvic pain.

Animal models have shown that PID can develop as early as 5 days following the acquisition of a genital chlamydial infection[4]. Just one episode of PID results in a 10% risk of ectopic pregnancy or infertility, the risk increasing to 20% and nearly 40% for a subsequent second and third episode of PID respectively[1]. Studies have shown that the risk of complications of PID, including ectopic pregnancy and infertility, are three times more likely in women who delay seeking care for PID by as little as 3 days after the onset of pelvic pain[4,5]. Tubal chlamydial infections may become chronic despite antibiotic therapy, and immunologic processes that can lead to tubal factor infertility may continue after microbiologic cure[6]. All of these factors highlight the importance of *preventing* chlamydial infections in order to prevent the secondary epidemic of PID and to further prevent the tertiary epidemics of ectopic pregnancy and infertility.

Counts and rates of hospitalization for PID in Canada are shown in Table 1. It appears that rates are highest among females 30 to 39 years old and lowest among those aged 15 to 19 years. Rates reaching nearly 400 cases per 100,000 were seen among females 30 to 39 years old in the mid-1990s. On the surface, it might appear that the rates of hospitalized PID cases in Canada are decreasing (Table 1). However, it is well understood that in recent years the treatment of both PID and ectopic pregnancy has shifted from hospital-based care (i.e. intravenous pharmacologic treatment, surgery) to outpatient treatment. This, combined with the lack of a single, accurate diagnostic test, differing case definitions and the difficulty in easily accessing the upper female genital tract, makes case-finding and the tracking of the number of PID cases that much more elusive. Even more troubling is the fact that PID as a result of chlamydial infection is more likely to be asymptomatic than PID caused by *Neisseria gonnorrhoeae*. This prompts the suggestion that as an increasing proportion of PID cases can be attributed to chlamydia, the face of PID is changing from a symptomatic disease (which prompted diagnosis and treatment) to a "silent" disease without symptoms[1,7]. Indeed, studies have shown that not just clinical PID but also silent PID can result in tubal damage, silent infections possibly being the most common cause of tubal infertility[1].

In Canada and across the world, the economic and social costs associated with PID are enormous. In 1993 the World Bank estimated that PID accounted for 94% of all STI-associated morbidity (*including* HIV-related morbidity) in women in the developed world[4]. In fact, when burden of disease is measured in terms of disability-adjusted life years, the burden of disease of PID in women outweighs the burden of disease of HIV in men[4]. However, the attention and resources focused across the world on the HIV and PID epidemics fail to reflect this.

Table 1. Counts and rates* of hospitalization for PID among females in Canada by age group, 1995-2001

Year		15-19	20-24	25-29	30-39	40-44
1995-1996	Cases	806	1,977	3,337	9,974	3,272
	Rate	83.8	200.2	308.7	386.1	282.8
1996-1997	Cases	791	1,614	3,015	9,312	3,284
	Rate	81.0	164.0	282.8	360.8	276.0
1997-1998	Cases	591	1,455	2,567	8,391	3,351
	Rate	59.9	147.7	243.6	327.8	272.9
1998-1999	Cases	518	1,290	2,367	7,979	3,216
	Rate	51.9	130.8	227.2	316.0	255.6
1999-2000	Cases	444	1,139	2,269	7,622	3,372
	Rate	44.0	114.3	220.1	306.5	263.4
2000-2001	Cases	443	1,146	1,967	7,041	3,422
	Rate	43.5	113.4	192.1	287.3	262.9

* Rate per 100,000 population. Population estimates provided by Statistics Canada.
Source: Canadian Institute for Health Information Discharge Abstracts Database.

Ectopic pregnancy

Ectopic pregnancy is the implantation of a fertilized egg outside the uterus, and it accounts for approximately 10% of pregnancy-related deaths. Rates of hospitalization for ectopic pregnancy among Canadian females appear to be highest in those 25 to 29 years of age; rates have been decreasing since 1995 (Table 2). This is likely due, at least in part, to the shift mentioned previously from hospital-based care to outpatient treatment.

In young women, chlamydia is the leading cause of ectopic pregnancy[5]. It is estimated that at least 2% of women with a lower genital tract chlamydial infection will experience ectopic pregnancy (or other adverse pregnancy outcomes)[1]. That percentage is startling when one considers the incredibly high numbers of chlamydia cases in young women between the ages of 15 and 24. A previous history of PID is the strongest predictor for ectopic pregnancy[8]. Studies have shown that a reduction in the rate of PID is strongly associated with a subsequent reduction in the rate of ectopic pregnancy[8].

Infertility

Rates of hospitalization for infertility among Canadian females are given in Table 3. The highest rates are seen among women 30 to 39 years old. Rates appear to have dropped from approximately 330 per 100,000 to 240 per 100,000 between 1995 and 2001; however, the shift from hospital-based care to outpatient care is the most likely contributing factor in this decline.

Despite the visibility of the issue of infertility in Canada, few are aware of its direct connection to STIs. Chlamydial PID is the most important preventable cause of infertility[1]. In the United States alone, 50,000 women each year become infertile as a result of chlamydial infection[2]. It is estimated that 3% of all women with a lower genital tract chlamydial infection will become infertile[1]. Antibodies to *C. trachomatis* have been found in over 80% of women with tubal factor infertility[2]. Unfortunately, because of the asymptomatic nature of chlamydia, in the majority of women with tubal factor infertility the chlamydia, or the PID, has never been diagnosed[1].

Table 2. Counts and rates* of hospitalization for ectopic pregnancy among females in Canada by age group, 1995-2001

Year		15-19	20-24	25-29	30-39	40-44
1995-1996	Cases	190	699	1,396	2,798	268
	Rate	19.7	70.8	129.1	108.3	23.2
1996-1997	Cases	169	661	1,293	2,658	256
	Rate	17.3	67.2	121.3	103.0	21.5
1997-1998	Cases	173	622	1,226	2,372	228
	Rate	17.5	63.2	116.3	92.7	18.6
1998-1999	Cases	156	665	1,156	2,271	274
	Rate	15.6	67.4	111.0	89.9	21.8
1999-2000	Cases	151	611	1,006	2,039	206
	Rate	15.0	61.3	97.6	82.0	16.1
2000-2001	Cases	167	572	925	1,983	249
	Rate	16.4	56.6	90.3	80.9	19.1

* Rate per 100,000 population. Population estimates provided by Statistics Canada.
Source: Canadian Institute for Health Information Discharge Abstracts Database.

Tubal factor infertility remains the most common reason for in-vitro fertilization, a most costly procedure[1]. Thus the expense to the health care system, as well as for individuals and the economy, due to chlamydia, PID and tubal factor infertility is enormous. Despite substantial investments in the science, technology, legislation and practice of assisted human reproduction in Canada, corresponding investments in the prevention of infertility through the prevention and control of STIs such as chlamydia are not up to par.

Mental health

The mental health costs associated with the sequelae of STIs are rarely examined, although the impact on the psychological well-being of the patients involved is significant. The experience of infertility caused by PID can be extremely stressful, and many studies have shown that anxiety and depression are highly prevalent among infertile women[9,19]. The feelings and emotions involved with the inability to conceive can greatly affect the mental health and well-being of women. In addition, the uncertainty and uncontrollability of fertility treatment outcomes can lead to feelings of anger, isolation, guilt and grief, and can put a strain on relationships. For some women being treated in fertility clinics, it has been found that the emotional aspects were even more stressful than the medical treatments themselves[20].

Prevention

If chlamydia were an infection impossible to prevent, difficult to medically diagnose and complicated to treat, the situation in Canada would truly be dire. How fortunate then, that these obstacles are not present. In fact, the transmission of chlamydia can be effectively prevented or, in the event of transmission, easily detected medically and then rapidly and successfully treated. Abstinence from penetrative sexual activity, mutual monogamy of uninfected partners and condom use all represent effective strategies for the prevention of chlamydia – if they are

Table 3. Counts and rates* of hospitalization for infertility among females in Canada by age group, 1995-2001

Year		15-19	20-24	25-29	30-39	40-44
1995-1996	Cases	45	752	2,937	8,596	1,009
	Rate	4.7	76.2	271.7	332.7	87.2
1996-1997	Cases	48	633	2,574	7,890	926
	Rate	4.9	64.3	241.4	305.7	77.8
1997-1998	Cases	30	518	2,130	7,049	912
	Rate	3.0	52.6	202.1	275.4	74.3
1998-1999	Cases	33	435	1,889	6,720	1,007
	Rate	3.3	44.1	181.3	266.1	80.0
1999-2000	Cases	28	420	1,884	6,430	983
	Rate	2.8	42.2	182.8	258.6	76.8
2000-2001	Cases	22	323	1,564	6,003	957
	Rate	2.2	32.0	152.7	244.9	73.5

* Rate per 100,000 population. Population estimates provided by Statistics Canada.
Source: Canadian Institute for Health Information Discharge Abstracts Database.

employed. Urine-based nucleic acid amplification testing (NAAT) allows for easy and readily accepted testing to assist in diagnosis. Treatment can be simplified to just once dose of antibiotics given orally for those at risk of not adhering to longer treatment regimens. All of these factors should contribute to the effective prevention and control of chlamydia and its sequelae, yet rates of the infection continue to climb. The tools for primary, secondary and tertiary prevention exist; what remains to be determined is how best to use them.

Unlike other countries, such as England[21,22], Canada currently has no dedicated national strategy to counter chlamydia and other STIs (with the exception of HIV) or their sequelae, including PID, ectopic pregnancy and preventable infertility.

STI IN THE INTERNATIONAL CONTEXT

It has become a truism in public health to observe that diseases recognize no borders. In 2004, approximately 763 million people worldwide crossed international borders, an increase of 73% since 1989[23]. These human movements facilitate the spread of many infectious diseases, including those transmitted through sexual contact.

STI prevention and treatment are important aspects of travel medicine and public health for several reasons:

- Travellers may engage in riskier sexual behaviour away from home[24];
- Some STIs are relatively uncommon and unfamiliar to clinicians in developed countries, and may go undiagnosed or be inappropriately treated; and,
- STIs acquired abroad, including asymptomatic infections, may have an antibiotic resistance profile different from those acquired in Canada[24,25].

For the same reasons, the international picture is a key consideration for national disease surveillance. The World Health Organization (WHO) estimated that in 1999 the prevalence of curable bacterial STIs in North America was 1,900 per 100,000 population; the Latin America/Caribbean region, a popular travel destination for Canadians, had a prevalence of 7,100 per 100,000 population[26].

In developed countries, a significant proportion of STIs are attributed to unprotected sex during travel abroad[27], and the number of Canadians travelling internationally is on the rise. Preliminary data indicate that in 2004 more Canadians travelled to destinations abroad than ever before. Canadian residents took a record number of more than 5.7 million trips to countries other than the United States (US) in the 2004 calendar year. Travel to and from the US also increased in the same period[28].

Comparison of international STI trends

The United Kingdom (UK) is the most popular overseas destination for Canadian tourists, and, within North America, Canadians most frequently head south to the United States[29]. Because of the frequency of travel and cultural similarities, these two jurisdictions have been chosen for comparison.

Differences in reporting systems and case definitions limit direct comparability of numbers, but assessment

Table 1. Reported cases and rates of bacterial STIs in 2004

	Genital chlamydia		Gonorrhea		Infectious syphilis[1]	
	Cases	Rate[2]	Cases	Rate[2]	Cases	Rate[2]
Canada	62,971	197.1	9,233	28.9	1,127	3.5
UK[3]	104,155	174.1	22,335	37.3	2,254	3.8
US[4]	929,462	319.6	330,132	113.5	7,980	2.7

[1] Note that Canada reports infectious syphilis defined as primary, secondary and early latent, whereas the UK and US include primary and secondary stages only.

[2] Rate per 100,000 population

[3] Source: The UK Collaborative Group for HIV and STI Surveillance. *Mapping the issues. HIV and other sexually transmitted infections in the United Kingdom: 2005.* London: Health Protection Agency, November 2005.

[4] Source: Centers for Disease Control and Prevention. *Sexually transmitted disease surveillance, 2004.* Atlanta: U.S. Department of Health and Human Services, September 2005.

of general trends can be used to infer similarities and differences in epidemics.

Genital chlamydia

- Chlamydia is the most commonly reported STI in all three countries (Table 1), and it is on the rise.
  - From 2003 to 2004, annual increases in reported rates ranged from 4% to 8%, with the largest increase occurring in the UK.
- The burden of infection lies disproportionately with youth and women. Rates are consistently highest in women aged 15 to 24 and men aged 20 to 24.

Gonorrhea

- There is greater heterogenecity across countries with respect to gonococcal infection. Unlike Canada, rates of gonorrhea are decreasing in the UK and the US.
  - In the US, gonorrhea was at its lowest reported rate ever in 2004. However, there are variations within population groups: decreases have been noted in populations with the highest rates (African Americans and adolescents), whereas increases have been observed among Caucasians.
  - In the UK, diagnoses of gonorrhea rose steadily between 1995 and 2002 but have gradually decreased since.
- There is further variation in the distribution of infection by age and sex. Although men are more likely to show signs of infection, as reflected in higher reported rates in both Canada and the UK, the rate among women is higher than among men in the US.

Syphilis

- Syphilis is reported differently across countries; however, comparison of broad trends and epidemiologic data show resurgence among specific populations.
  - National trends continue their upward trajectory, with the highest rates in older males. Outbreaks among men who have sex with men (MSM) are common to all three countries.
  - Males account for a substantial and increasing proportion of Canadian cases, consistent with both the UK and US.
- In the US, the rate of primary and secondary syphilis has increased each year since 2001, primarily among men.
  - From 2003 to 2004, the rate of reported cases among women remained steady at 0.8 per 100,000, whereas rates of congenital syphilis continued to decline.
- In the UK, between 2003 and 2004, primary and secondary syphilis diagnoses rose by 37%.
  - 88% of cases were in males, of whom more than half were MSM.
  - Highest rates were reported among men 25 to 34 years old (17/100,000), 35 to 44 years old (16/100,000) and in women aged 20 to 24 years (4/100,000).

STI strategies in the UK, the US and Canada

As part of a comprehensive National Strategy for Sexual Health and HIV, published in 2001, the UK Health Protection Agency (HPA) has invested in major screening and treatment improvement initiatives[30]. The National Chlamydia Screening Program, which began in 2002, provides for opportunistic screening of men and women attending health care settings other than genitourinary medicine clinics (~25% of all primary care trusts in England). This allows the HPA to better characterize the chlamydia epidemic in England and encourages individuals who may be asymptomatic to be tested for chlamydia infection, potentially averting greater future health costs to the individual as well as the system[22].

Beginning with a 1979 Surgeon General's Report, "Healthy People", the United States has set national health promotion and disease prevention objectives by means of Healthy People reports and targets for 2000 and 2010. Healthy People 2010 (http://www.cdc.gov/nchs/about/otheract/hpdata2010/abouthp.htm) includes an STI focus area that establishes baseline values, year 2010 targets and annual updates for key STI control goals. Some goals are measurable through core notifiable disease surveillance mechanisms in the US and additional screening initiatives have been created to target populations of special concern:

- Regional infertility prevention projects were implemented beginning in the late 1980s to screen women attending family planning clinics.
- Since 1990, the National Job Training Program screens tens of thousands of entrants annually. Participants in this program are economically disadvantaged youth aged 16 to 24.
- The Corrections STD Prevalence Monitoring Project tests persons entering jails or juvenile correction facilities for chlamydia, gonorrhea and syphilis. Testing at intake provides a treatment opportunity for individuals who may not have had access to health care and reduces transmission in the general community.

In 1997, Canada set national goals for the control of STIs and associated sequelae, including pelvic inflammatory disease and ectopic pregnancy[31]. Secular trends have made it clear that many of these goals have not been, or will not be, met by their respective target dates. National goals are now being revisited in light of the current STI and public health environment, and the need to address STI prevention has never been greater. Long-term commitments to enhancing integrated STI/HIV screening across the country, especially in populations at high risk of STIs and their sequelae, are desperately needed in Canada.

Emerging international STI issues

Observation of international trends gives some perspective to domestic rates and may foreshadow local epidemic shifts. The first two examples below describe recent international changes in STI epidemiology that were subsequently identified in Canada.

- Lymphogranuloma venereum (LGV) was rare in industrialized countries until cases were identified in MSM in European countries in 2003. Raising awareness of the European outbreaks among Canadian health care providers prompted identification of serious infections that would have been difficult to recognize and diagnose appropriately[32].
- After concerns were raised about the emergence of ciprofloxacin-resistant *Neisseria gonorrhoeae* in parts of Asia and Hawaii, resistant gonococcal isolates were identified in mainland US and Canada. The latest Canadian recommendations for the treatment of gonorrhea have been altered to adjust for these resistance patterns[33].
- A small but alarming number of treatment failures have been reported for azithromycin used to treat cases of primary and secondary syphilis in San Francisco[34]; this may serve as an early warning for health care providers in Canada.

GENITAL CHLAMYDIA

(*Chlamydia trachomatis*)

Key Points:

- ***In 2004, genital chlamydia infection remained the most commonly reported STI and notifiable disease in Canada.***
- ***Chlamydia disproportionately affects young women aged 15 to 24, who accounted for almost 50% of all reported cases in 2004.***
- ***A significant proportion of cases were asymptomatic (and therefore went undetected), putting women at risk of reproductive health complications.***

- Genital chlamydia, a bacterial infection caused by *Chlamydia trachomatis*, is the most commonly reported notifiable disease in Canada.
  - *C. trachomatis* serovars D to K cause infection in the genital and anal regions.
  - Serovars L1, L2 and L3 cause the infection lymphogranuloma venereum (LGV), which is not routinely reportable but is under enhanced surveillance (refer to Viral STI and Enhanced Surveillance chapter).
- Because genital chlamydia disproportionately affects a younger population, particularly females, the consequences of untreated infection are of great concern.
  - Sequelae for women include pelvic inflammatory disease (PID), which can lead to chronic pelvic pain, ectopic pregnancy, and infertility. Pregnant women may transmit the infection to their infant, causing conjunctivitis or pneumonia.
  - Less frequently, males develop epididymo-orchitis or other less common conditions[33].
- Chlamydial infection, like all bacterial STIs, increases the risk of acquisition and/or transmission of HIV.
- Chlamydia rates, first reported in 1991, declined until 1997, when this favourable downward trend was reversed (Figure 1).
  - The overall rate in 2004 increased by approximately 10% from 2002 and by over 70% from 1997 (Table 1).

Table 1.
Number of reported cases and rates of genital chlamydia infection in Canada, 1997, 2002 and 2004

Year	Number of reported cases	Rate[1]
1997	34,144	113.9
2002	56,266	179.4
2004[2]	62,971	197.1

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

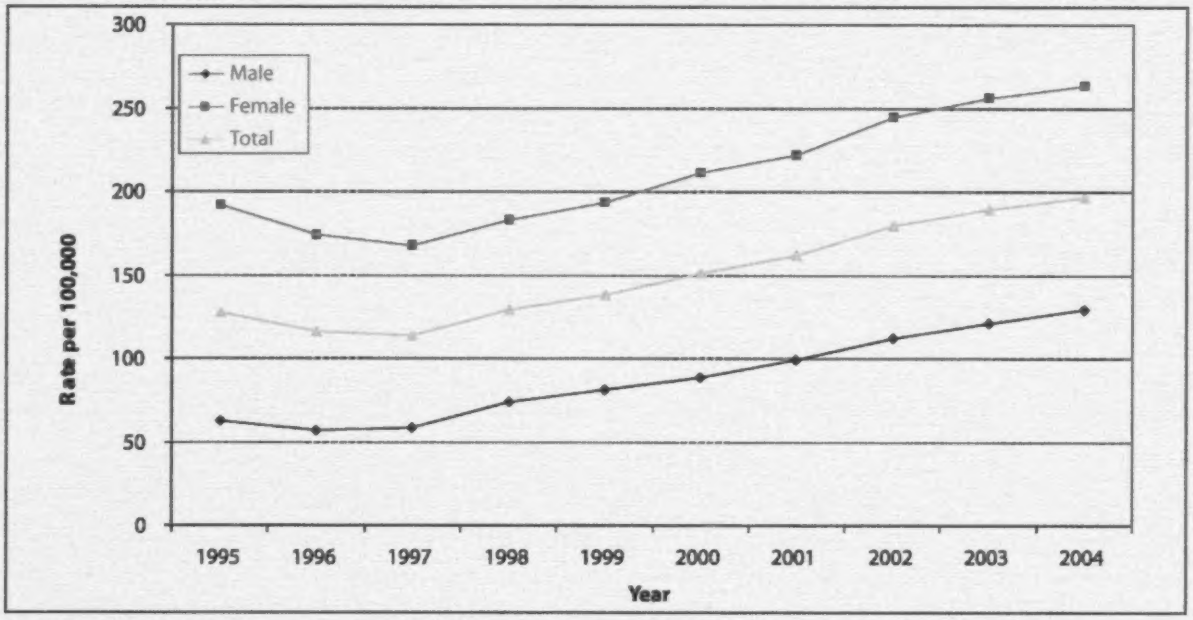
The burden of infection is borne by females, who accounted for two-thirds of all reported chlamydia cases in 2004.

Women with a diagnosis of chlamydia are more likely to be young: those aged 15 to 24 years accounted for 73% of female cases and 49% of all cases in the same time period.

Sex and age distribution

- Reported chlamydia cases are concentrated in the under-30 population in both sexes. Taken as a group, they accounted for over 80% of all reported chlamydia cases in 2004 (Figure 2).
  - This is in contrast to gonorrhea and infectious syphilis, in which the same age group accounts for 65% and 18% of reported cases respectively.

Figure 1. Reported rates[1] of genital chlamydia in Canada, 1995-2004[2]



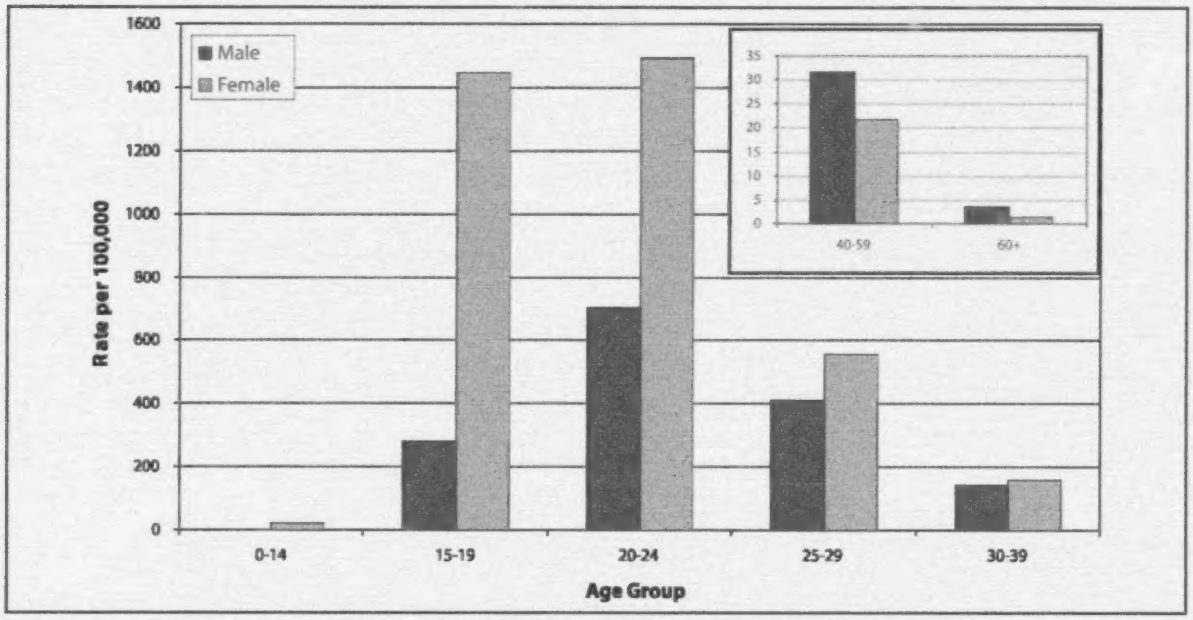
[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

- While young women continue to be disproportionately affected by chlamydia, there has been a minor yet sustained pattern of increasing numbers of reported cases among men.
  - In 1997, males accounted for one-quarter of all reported cases. By 2004, that proportion had crept upwards to 33%.
  - The largest shift in the distribution by sex was in 15 to 24-year-olds, in which the male-to-female case ratio went from 1:6.3 in 1997 to 1:4.9 in 2004.
- In older age groups, the inequity between the sexes diminishes.
  - For those over 40 years of age, males actually had higher rates of chlamydia than females. There was a shift from an almost equal 1:1 ratio of males to females in 1997 to 1.5:1 in 2004.
  - 1998 marks the transition to higher rates among males than females in the 60+ age group, a shift that has remained consistent over time.

Males

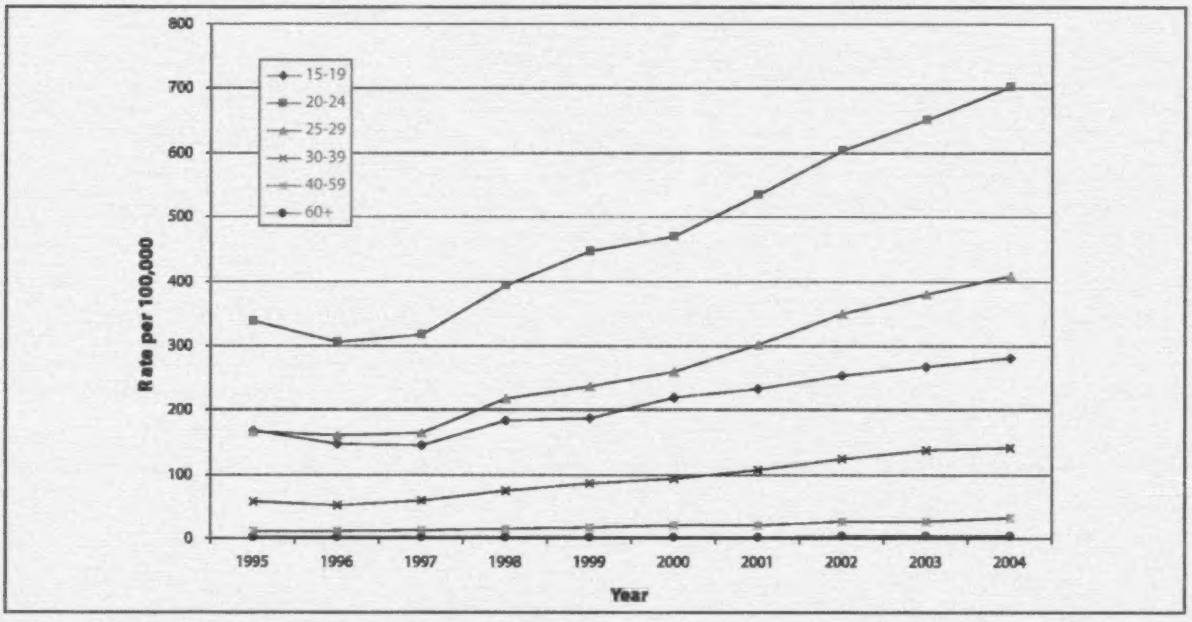
- The majority of reported chlamydia cases in males occur in those aged 20 to 29 years, accounting for over 60% of reported male cases (Figure 3).
  - The 20 to 24 age group has the highest rate in males.
- The relative age distribution of cases has remained stable in recent years.
  - A shift occurred in the early 1990s towards older males, when men 25 to 29 years old surpassed those 15 to 19 years old as the group with the second highest rates.
- Since 1997, the most dramatic increase in males has been in those over 60 (Table 2).
  - Case counts are relatively small (21 cases in 1997 increasing to 91 cases in 2004).
- From 1997 to 2004, chlamydia rates in all male age groups continued to rise.

Figure 2. Reported genital chlamydia rates[1] by sex and age group, 2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Figure 3. Reported rates[1] of genital chlamydia among males by age group, 1995-2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Table 2. Reported rates[1] of genital chlamydia among males: % increase 1997-2004[2]

Age	1997	2004	% Change
15-19	144.7	280.9	94
20-24	316.1	702.1	122
25-29	164.3	408.3	149
30-39	59.8	142.0	138
40-59	12.5	31.7	153
60+	1.0	3.6	270
Total	**58.7**	**129.5**	**121**

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Females

- The reported rate of chlamydia among young women 15 to 24 years of age is approximately 7 times higher than the national average (approximately 1,450 per 100,000 compared with 197 per 100,000).
  - This group and the 25 to 29 year group account for almost 90% of all female cases (Figure 4).
- From 1997 to 2004, chlamydia rates among females have been steadily climbing (Table 3).
- The largest percent change in rates since 1997 occurred in the 30 to 39 age group (from 2,103 cases to 3,684 cases), with an increase of 95%.

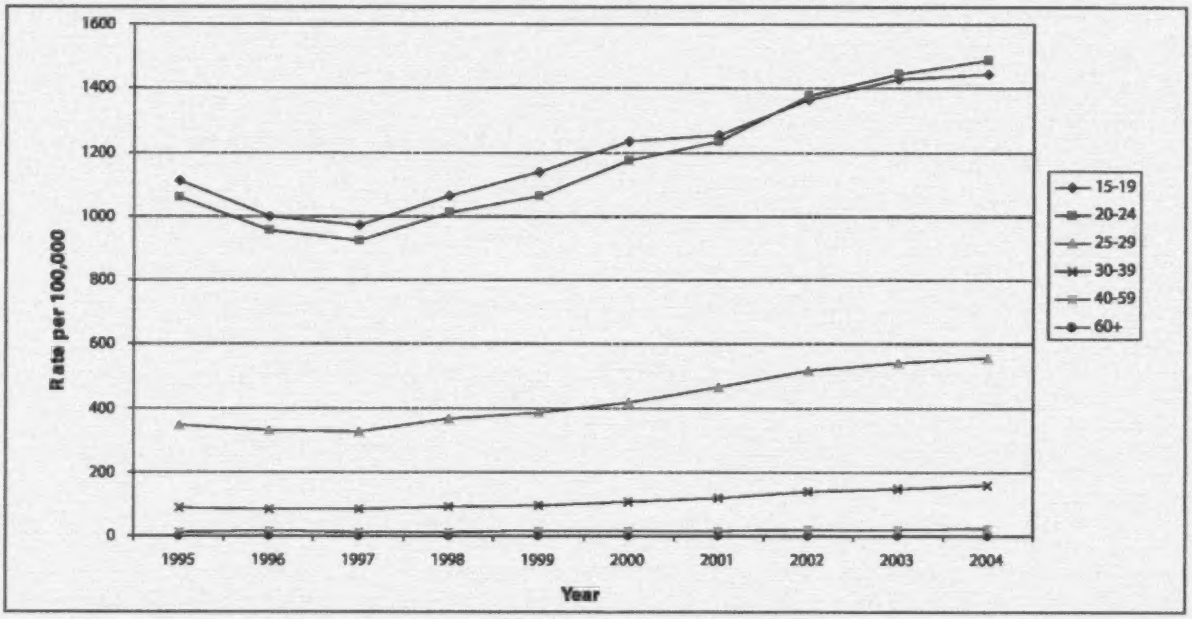
Table 3. Reported rates[1] of genital chlamydia among females: % increase 1997-2004[2]

Age	1997	2004	% Change
15-19	971.3	1,443.6	49
20-24	924.1	1,489.4	61
25-29	325.8	557.6	71
30-39	81.9	160.1	95
40-59	13.2	21.9	67
60+	1.2	1.4	12
Total	**167.8**	**263.2**	**57**

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Figure 4. Reported rates[1] of genital chlamydia among females by age group, 1995-2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

- More recently, between 2002 and 2004, the largest percent increase in rates was seen in the 60+ and 40 to 59 year female age groups (67% and 19% respectively).

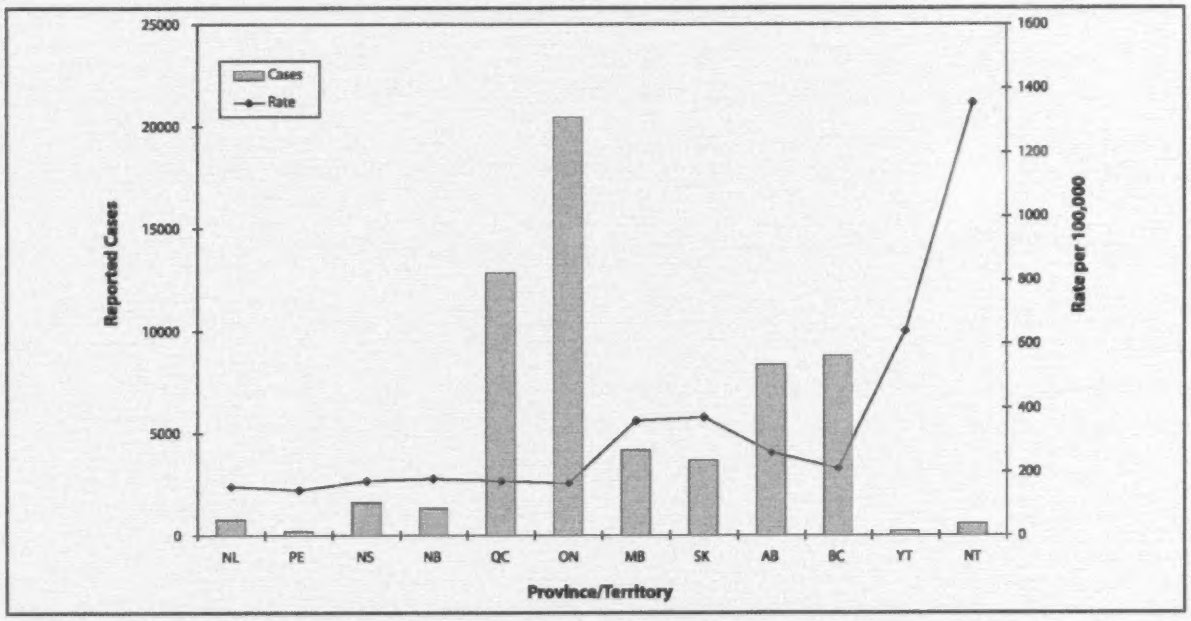
Geographic distribution

- Like gonorrhea, rates of chlamydia were highest in the north in 2004 (Figure 5). The Northwest Territories has the highest rate (1,353.5 per 100,000 or 580 cases), followed distantly by Yukon (638.5 per 100,000 or 197 cases).
  - Nunavut traditionally reports high rates of chlamydia, but data were not available for 2004.
  - Saskatchewan, followed by Manitoba, has the highest rates among the provinces, again echoing the patterns seen in gonorrhea.
- Most provinces/territories mirror the national trend over time, reflecting a widespread increase in reported cases from 1997 to the present.
  - While remaining below the national average, Newfoundland's reported rates climbed substantially from 1997 to 2004 (150%).
  - The rates doubled over the same period in both British Columbia and Quebec.
- Jurisdictions with smaller populations (Prince Edward Island, Yukon and Northwest Territories) report more variation over time.
  - Data based on small numbers are more prone to fluctuation.

Geographic and sex distribution

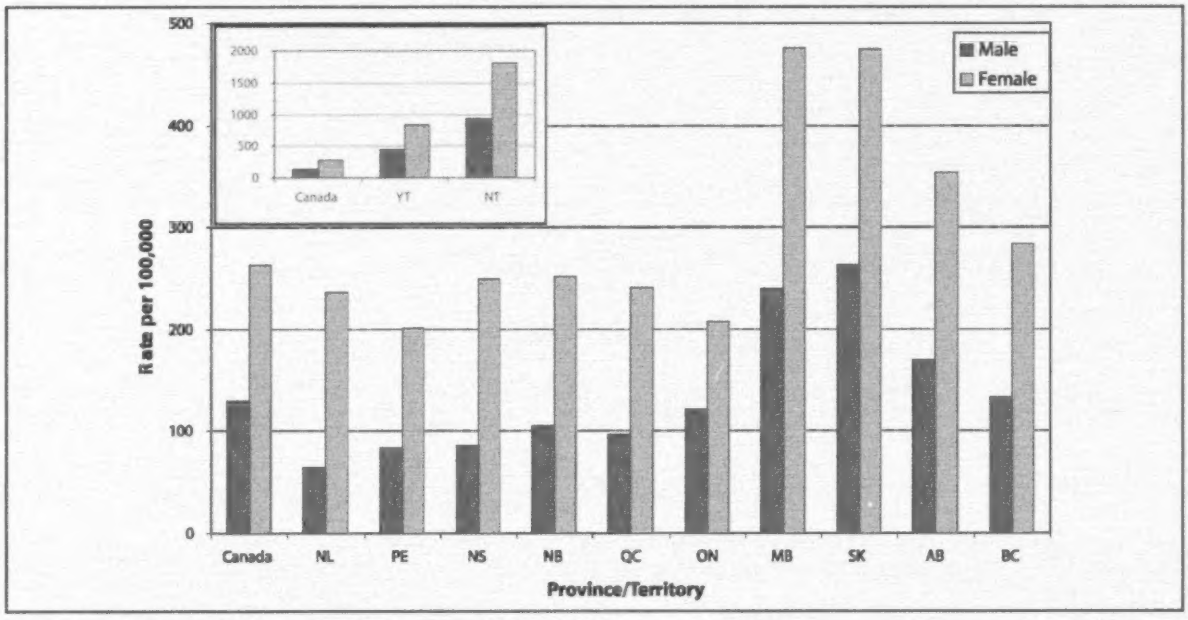
- The sex distribution of chlamydia across Canada is quite uniform. All jurisdictions have higher reported rates of chlamydia among females, which is reflected in the national picture (Figure 6).
  - In 2004, the national male-to-female case ratio was 1:2. By comparison, Newfoundland had the highest proportion of reported female cases (1:3.8), and Ontario reported the lowest (1:1.8).

Figure 5. Reported cases and rates[1] of genital chlamydia by province/territory[2], 2004[3]



1 Rate per 100,000 population. Population estimates provided by Statistics Canada.
2 Nunavut data unavailable.
3 2004 numbers are preliminary, and changes are anticipated.

Figure 6. Reported rate[1] of genital chlamydia by sex and province/territory[2], 2004[3]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] Nunavut data unavailable.

[3] 2004 numbers are preliminary, and changes are anticipated.

- With the exception of Prince Edward Island, the proportion of male cases increased in all provinces/territories between 1997 and 2004.
  - The largest changes occurred in Yukon, Manitoba and Ontario.

Discussion

Since 1997, rates of chlamydia have continued to climb steadily, reaching previously unattained heights with each passing year. People under 30 years of age, particularly young women, continue to be disproportionately affected by chlamydia.

Of particular concern is the fact that cases captured by routine and enhanced surveillance systems most certainly underestimate the true prevalence of chlamydial infection in the Canadian population. The majority of infected individuals are asymptomatic (50% of men and 70% of women) and therefore unlikely to present for testing and treatment[33]. The higher proportion of cases among females may in part be explained by the fact that women could more likely be screened for chlamydia when they present for other routine medical care (e.g. birth control, Pap tests, prenatal visits). While many untreated chlamydia infections eventually resolve without medical intervention, individuals unaware of their infection can continue to transmit the bacteria for many months and may suffer serious health consequences such as infertility.

A change in laboratory diagnostic testing methods may account for some of the increase in reported chlamydia cases. NAAT (nucleic acid amplification testing), introduced across Canada in the late 1990s, has two significant advantages over other testing methods: improved sensitivity and non-invasive specimen collection. Collection of a urine sample is more acceptable to males than a urethral swab, removing a potential barrier to testing that may account for the observed shift in the male-to-female ratio.

While the introduction of NAAT could account for an initial rise in reported cases, it is unlikely the single and most important contributing factor. One would expect that the initial rise in cases would be

followed by a decrease in the transmission of chlamydia as a result of improved detection and treatment, subsequently reducing the number of reported cases. Since this reduction in rates has not been observed and, furthermore, gonorrhea and infectious syphilis rates have shown an upswing since 1997, it is likely that there has been a true increase in incidence attributable to other factors. Examples of these factors are increases in risky behaviour, lassitude related to safer sexual practices and lack of knowledge among youth about STI/HIV transmission.

Although routine surveillance data at the national level are useful in analyzing population-based trends, data are limited in terms of providing insight into risk factors and behaviours in various subpopulations within the age/sex/region paradigm that would better direct prevention efforts. A number of national and international studies shed some light on factors that may be contributing to chlamydia trends. One survey conducted by the Canadian Association for Adolescent Health reported that nearly one in three teens aged 14 to 17 reported being sexually active and that a quarter of those did not use any form of protection against STIs the last time they had sex[35]. In the UK, lower observed rates of infection among women over 25 have been attributed to reduced sexual behaviour risks and decreased susceptibility to infection[36]. A lower rate of partner change, more common in those over 30 years, is one example of reducing risk[37]. It has also been hypothesized that the general increase in chlamydia, not particularly attributable to one core group, may be due, in part, to early treatment, which dulls the natural immune response, increasing the likelihood of re-infection[38].

Of particular concern in relation to chlamydia is that an estimated 10% to 40% of infected women will develop pelvic inflammatory disease which may compromise their ability to conceive[37]. The consistently higher rates among young women, coupled with the potential for a serious impact on their health and fertility, suggest that prevention and control efforts are critical for this population. Internationally, countries are increasingly recognizing the global rise in chlamydia rates and committing funding to prevention programs to stem this alarming trend. Australia is a prime example: as a result of three-fold increase in the reported cases of chlamydia (41,000 cases reported in 2005), the government committed $12.5 million to increase awareness of chlamydia and improve the country's surveillance system[39].

The burden of infection and costs to Canadian society of this most commonly reported notifiable disease cannot be overstated. The social and economic costs associated with chlamydia and its consequences are considerable[37,40]. The tragedy is that these costs could be largely avoided through the development and implementation of effective, population-targeted prevention and control strategies; those that address common risk factors and behaviours associated with STIs and blood-borne pathogens have the potential for an even greater impact. A screening program, such as that introduced in the UK[41], coupled with partner notification, sex- and population-specific public awareness and prevention campaigns, and ongoing physician education would greatly assist efforts to control chlamydia.

GONORRHEA

(*Neisseria gonorrhoeae*)

Key Points:

- ***The reported rate of gonorrhea continues to increase in Canada, with an increase of 94% between 1997 and 2004.***
- ***Males aged 20 to 29 years are the most affected age group.***
- ***Gonococcal resistance to ciprofloxacin, once considered an effective first line treatment, is becoming an issue for some regions across the country.***

- Gonorrhea, an infection caused by the bacterium *Neisseria gonorrhoeae*, is the second most commonly reported STI in Canada.
- Consequences of untreated gonorrhea infection are of concern for both sexes but can be especially severe for women.
  - Young women can develop pelvic inflammatory disease (PID), which can lead to chronic abdominal pain, infertility and ectopic pregnancy.
  - Males with an untreated infection are at risk of epididymitis and, rarely, infertility.
  - Though uncommon, gonorrhea can spread to the blood stream and joints[42].
- HIV-positive individuals infected with gonorrhea are more likely to transmit the virus[43]. The reverse is also true, i.e., individuals with gonorrhea who are exposed to HIV are more likely to acquire the virus.
- The substantial decreases in gonorrhea rates witnessed throughout the 1980s and early 1990s have been reversed (Figure 1).
  - The national rate has increased by 94% since its nadir in 1997, to 28.9 per 100,000 in 2004 (9,233 cases).
- The rise is evident in both sexes, although it has been greater among males (106%) than females (76%).

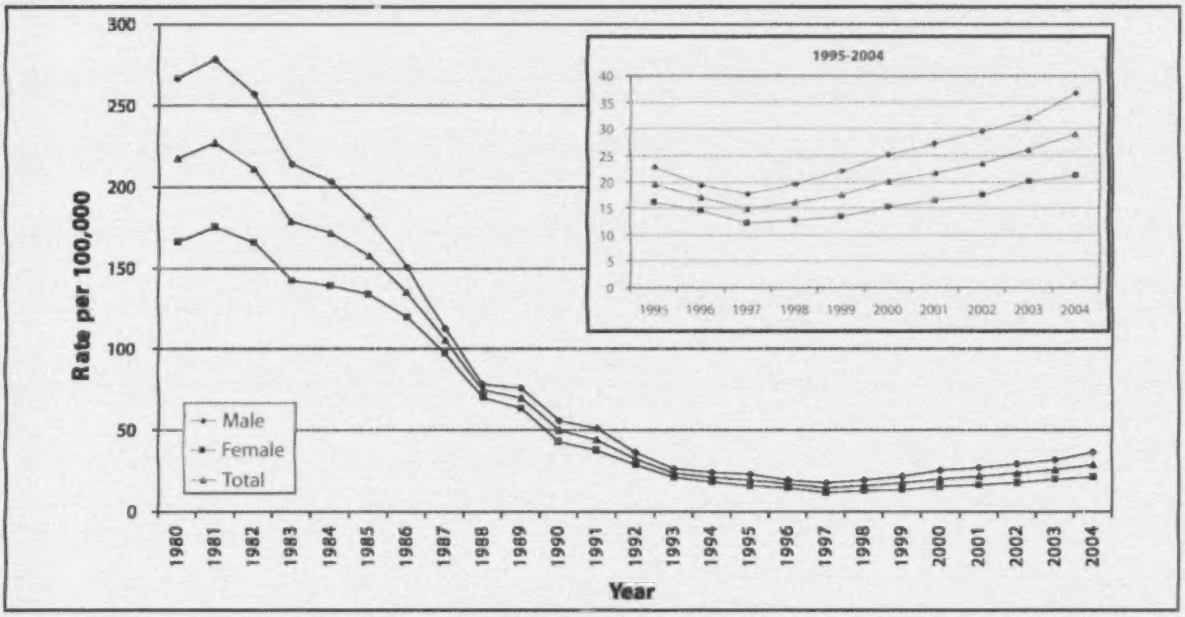
Sex and age distribution

- Most gonorrhea case reports at the national level occur in males. Data suggest that the gap between the sexes is widening.
  - The male-to-female ratio has shifted over the last decade, from 1.3:1 in 1997 to 1.7:1 in 2004.
- The age distribution also varies between the sexes (Figure 2).
  - In 2004, young females aged 15 to 24 accounted for about 70% of all cases reported in women. This proportion has remained consistent over the past 7 years.
  - Young adults (20 to 29 years old) represent over 40% of all cases in males, but those aged 30 to 39 years account for a substantial proportion of reported gonorrhea infections.

Males

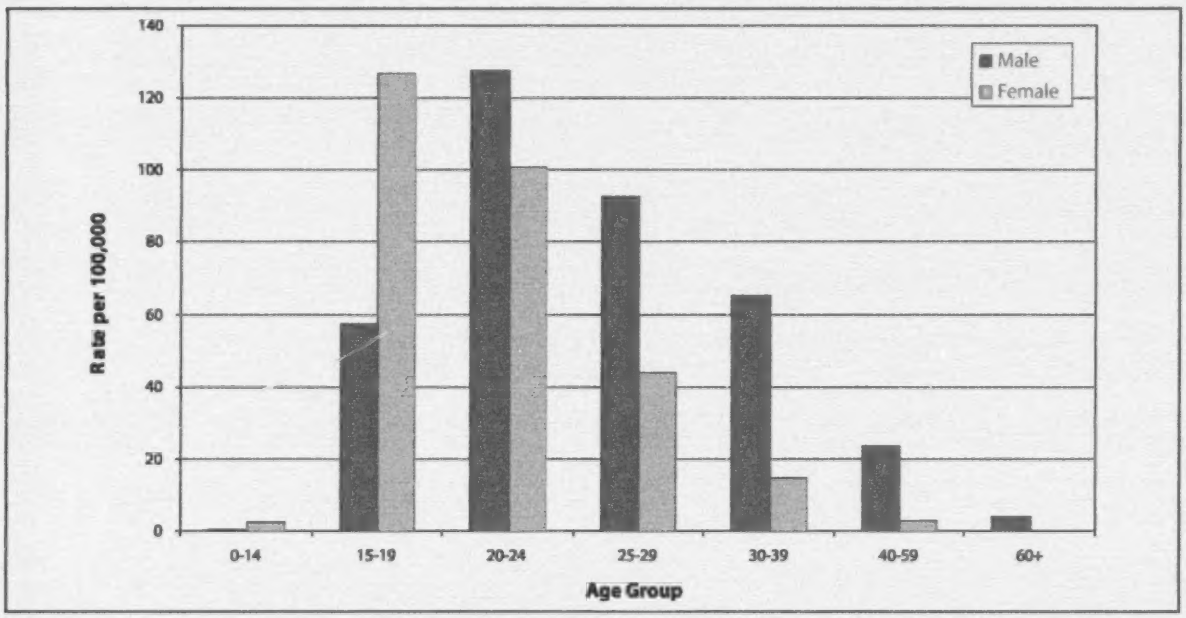
- In males, gonorrhea is distributed across a wide range of ages.
- Males 20 to 29 years remain the most affected age group. A sharper increase in the age group 20 to 24 years of age from 2003 to 2004 compared with other age groups has been observed (Figure 3).
- From 1997 to 2004, the greatest percent increase in rates was observed among males over 60 years of age, followed closely by the 40 to 59 age group (Table 1).

Figure 1. Reported rates[1] of gonorrhea in Canada, 1980-2004[2]



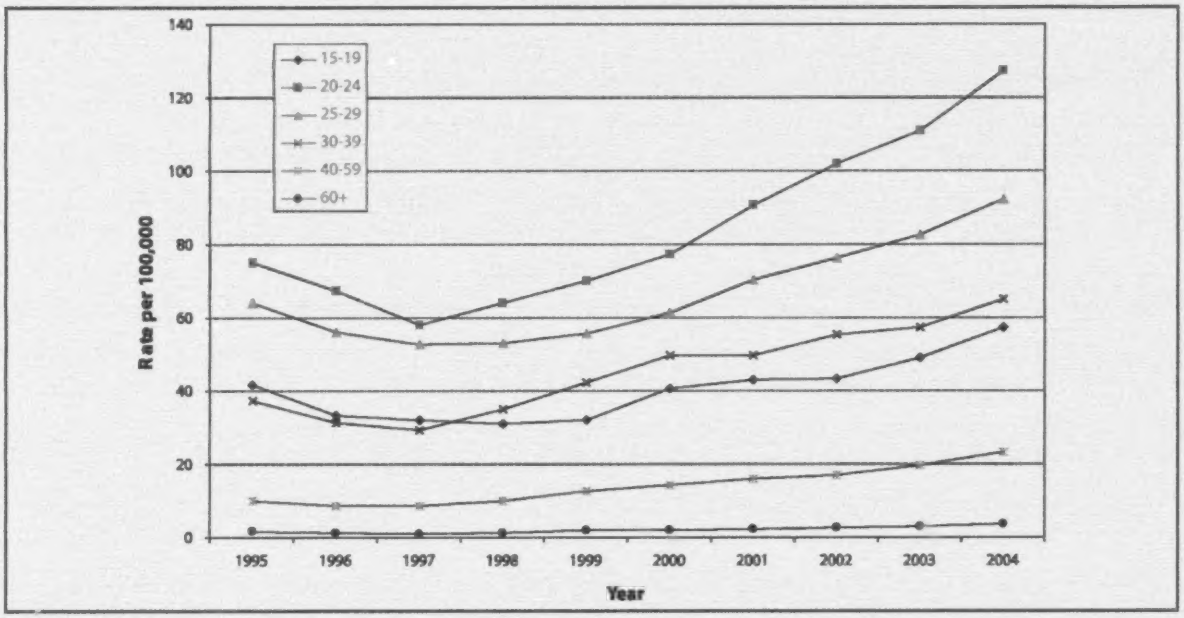
[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Figure 2. Reported rates[1] of gonorrhea by sex and age group, 2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Figure 3. Reported rates[1] of gonorrhea among males by age group, 1995-2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

- The overall rate is still low in comparison with the other age groups, but this strengthens the concern that the infection is shifting into an older cohort.

Table 1.
Reported rates[1] of gonorrhea among males: % increase 1997-2004[2]

Age	1997	2004	% Change
15-19	31.9	57.3	80
20-24	58.1	127.5	120
25-29	52.5	92.5	76
30-39	29.3	65.1	122
40-59	8.7	23.3	168
60+	1.1	3.8	253
Total	**17.8**	**36.8**	**106**

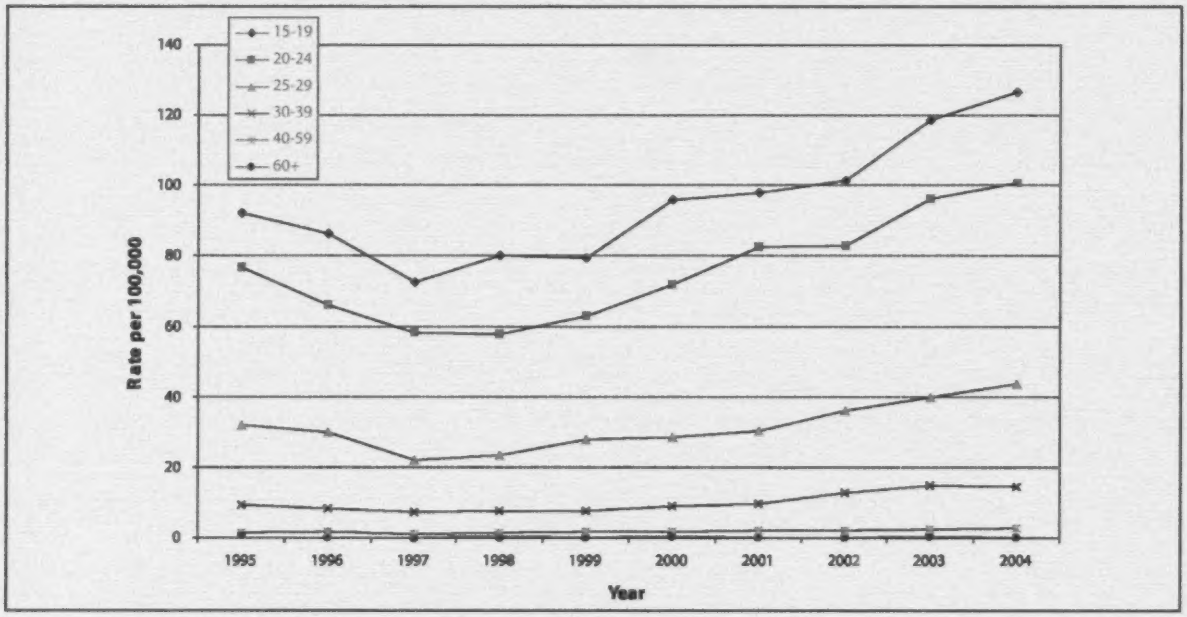
[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Females

- In contrast to males, younger women aged 15 to 24 years account for the majority of gonorrhea cases (Figure 4). In 2004, less than 15% of cases were in women over 30.
- Reported rates of diagnosed gonococcal infection among females have increased across all ages (Table 2).
- While the overall rate remains relatively low, women aged 40 to 59 years are the group with the greatest absolute increase in cases (42 cases in 1997 increasing to 131 cases in 2004).

Figure 4. Reported rates[1] of gonorrhea among females by age group, 1995-2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Table 2. Reported rates[1] of gonorrhea among females: % increase 1997-2004[2]

Age	1997	2004	% Change
15-19	72.5	126.7	75
20-24	58.2	100.7	73
25-29	22.1	43.7	97
30-39	7.2	14.5	103
40-59	1.1	2.8	155
60+	0.1	0.2	10
Total	**12.0**	**21.1**	**76**

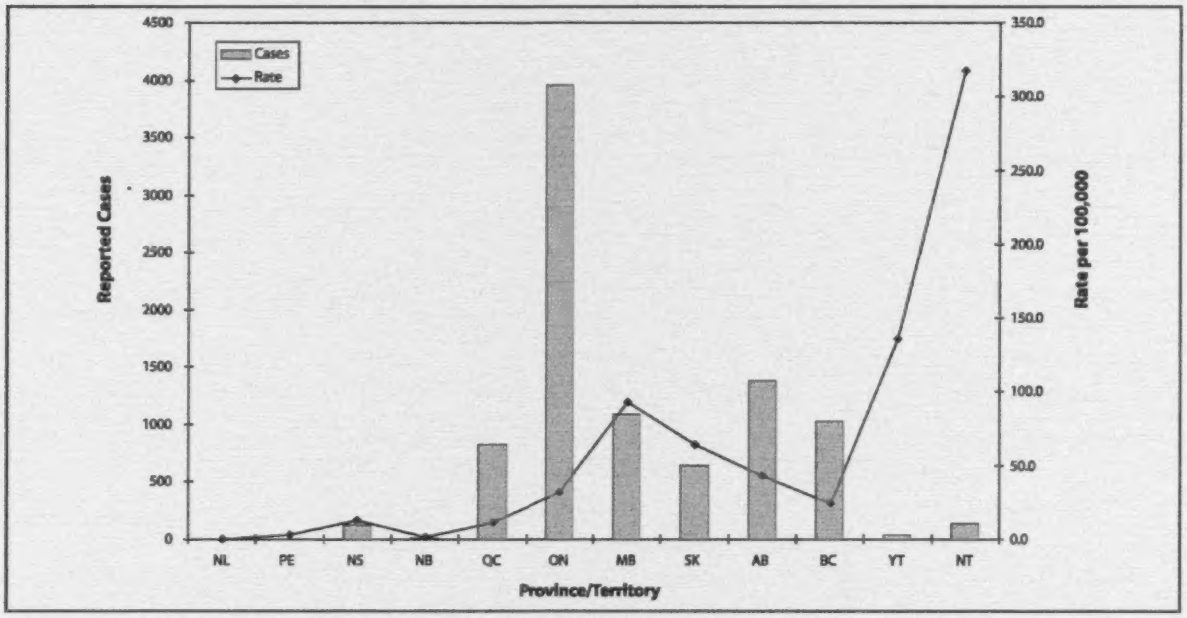
[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Geographic distribution

- Although case counts are small, rates of gonorrhea remained substantially higher in the north in 2004. The Northwest Territories had the highest rate (317.4 per 100,000 or 136 cases), followed by Yukon (136.1 per 100,000 or 42 cases).
  - Nunavut has previously reported high gonorrhea rates, but data from Nunavut were not available for 2004.
  - Among the provinces, Manitoba and Saskatchewan have the highest rates of gonorrhea.
- Across the Prairies and British Columbia, rates of gonorrhea have been increasing dramatically.
  - This can be partially explained by regional outbreaks.
- The Atlantic provinces, with the exception of Nova Scotia, have few gonorrhea cases and do not affect the national picture significantly.
- Recently, there have been minor regional shifts worth highlighting:
  - Quebec's overall rate decreased slightly from 2002 to 2004.

Figure 5. Reported cases and rates[1] of gonorrhea by province/territory[2], 2004[3]



1 Rate per 100,000 population. Population estimates provided by Statistics Canada.
2 Nunavut data unavailable.
3 2004 numbers are preliminary, and changes are anticipated.

- Yukon's increase has been most dramatic, with 42 cases of gonorrhea in 2004, or almost a 4-fold increase from 2002.

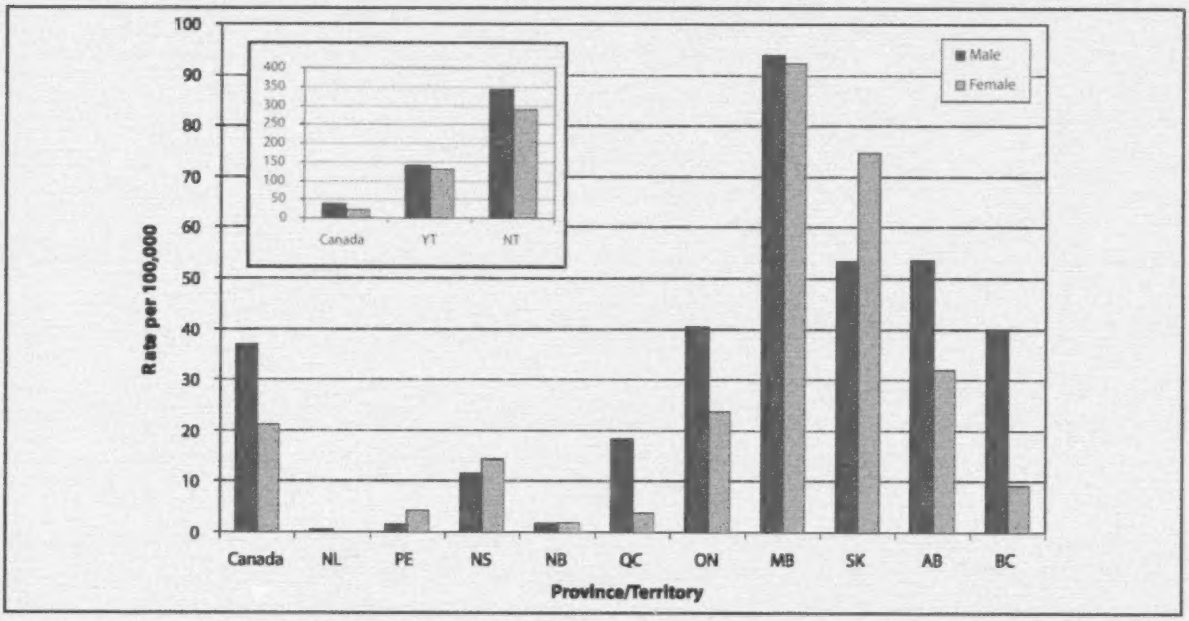
Geographic and sex distribution

- The national sex distribution, indicating that males represented about two-thirds of all gonorrhea cases in 2004, masks regional variation (Figure 6).
- The most populous provinces (Alberta, British Columbia, Quebec and Ontario), report more males cases, heavily influencing the national picture.
  - The largest proportion of male cases within a jurisdiction is in Quebec and British Columbia (both approximately 80%). Ontario and Alberta reflect the national average.
  - Of the provinces that routinely report a substantial number of cases, both Saskatchewan and Nova Scotia report slightly more females than males. Over time, the sex distribution has shifted in some jurisdictions.
  - Within the last couple of years, the balance has swung towards females in Saskatchewan and Nova Scotia and towards males in Alberta and British Columbia.

Neisseria gonorrhoeae antimicrobial resistance

- Some pathogens have developed resistance to antimicrobials over time, making infections difficult or impossible to cure.
- Uncomplicated gonorrhea can be treated with a single dose of antibiotics given orally or by injection. The challenge arises when resistant strains are treated with antibiotics to which the bacteria have decreased susceptibility. When this occurs there is increased likelihood of transmission due to treatment failure and the development of adverse sequelae unless the

Figure 6. Reported rates[1] of gonorrhea by sex and province/territory[2], 2004[3]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] Nunavut data unavailable.
[3] 2004 numbers are preliminary, and changes are anticipated.

resistant organism is identified and treated appropriately.

- Further, the WHO states that gonococcal resistance has become a driving force in the HIV epidemic. Studies show that individuals co-infected with HIV and gonorrhea shed the virus at a much higher rate than those with HIV alone[44]. Thus, prolonged periods of infection due to treatment failure increase the likelihood of HIV transmission in co-infected individuals.

- Representative, timely national surveillance data are critical to guide treatment guidelines and have a direct impact on managing infections and reducing transmission.
- The global emergence of new resistant strains must also be monitored.
  - The first Canadian cases of ciprofloxacin-resistant gonorrhea were introduced from abroad[45,46].
  - In the UK, a small but important increase in azithromycin resistance among tested isolates was identified from 2003 (0.9%) to 2004 (1.8%)[47].

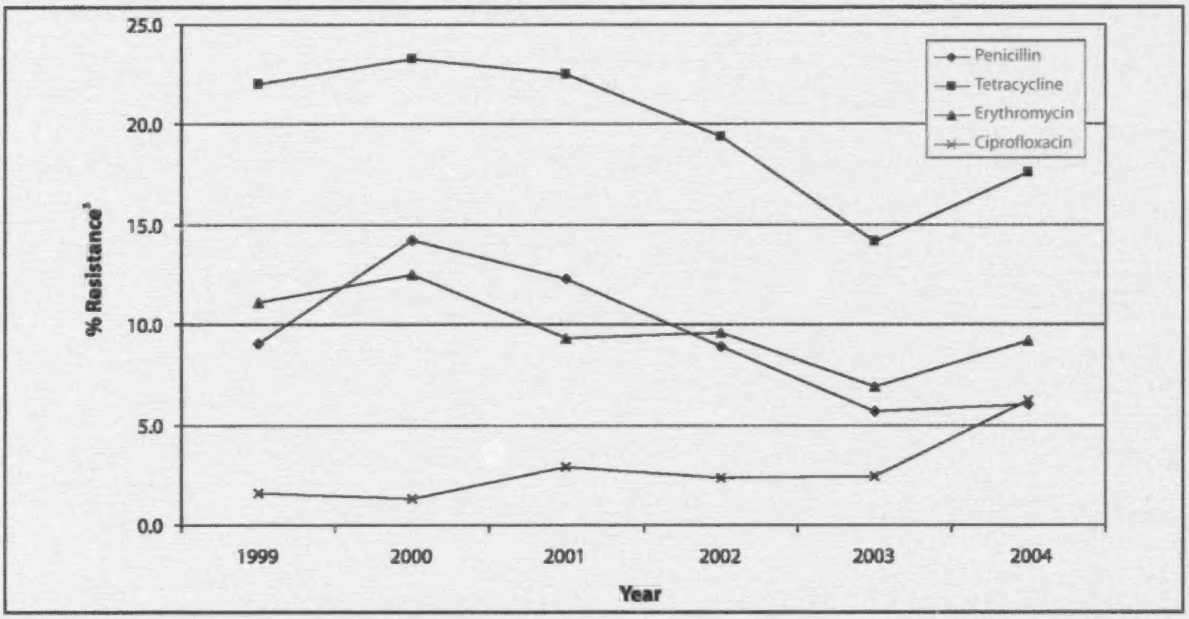
Canadian surveillance methodology

- Canadian gonococcal resistance surveillance is a collaborative effort between the National Microbiology Laboratory (NML) and provincial and territorial laboratories.
- NML requests that all provincial and territorial laboratories submit gonococcal isolates that have decreased susceptibility to at least one antibiotic.
  - Submission of samples is voluntary and not standardized across the country.
  - At least one province does not submit all routine resistant strains for testing but does submit strains for result confirmation.
- In addition to confirmatory testing of minimum inhibitory concentrations, NML augments provincial and territorial laboratory results by

providing plasmid profiling, auxotyping, confirmation by PCR (polymerase chain reaction), genotyping and pulsed-field gel electrophoresis.

- Antibiotics tested for gonococcal resistance at the NML include penicillin, tetracycline, spectinomycin, erythromycin, azithromycin, ciprofloxacin, cefixime and ceftriaxone[38].
  - Isolates can be resistant to more than one antibiotic (e.g., penicillin and tetracycline).
- Gonococcal resistance to penicillin, erythromycin and tetracycline has long been established. None of these antibiotics are recommended treatments.
- Resistance to ciprofloxacin (a fluoroquinolone), first identified in the early 1990s, continues to increase.
- In 2004, 6.2% of cultured strains demonstrated resistance to ciprofloxacin, up from 2.1% in 2003 (Figure 7).
  - Regional variation ranges from 0% to 17%, so not all parts of the country are equally affected by this development, which has significant implications for treatment options.
  - Ontario, Quebec, Alberta and British Columbia are all above the 3% threshold.
- Since ciprofloxacin resistance increased so dramatically from 2003 to 2004, the *Canadian Guidelines on Sexually Transmitted Infections 2006 edition*, have qualified the use of this antibiotic as a first line treatment[33].
  - Practitioners are asked to contact local public health to ascertain the epidemiology of quinolone resistance in their area. For example, in Alberta in 2004, all cases of ciprofloxacin resistance occurred in MSM or were linked to travel outside of the province. Therefore, ciprofloxacin remains a recommended agent in Alberta except in these cases[33].

Figure 7. Antimicrobial susceptibility of *N. gonorrhoeae* strains[1] tested in Canada, 1999-2004[2]



1 There were no resistant strains for cefixime or ceftriaxone. There was one resistant specimen for spectinomycin in 1999.
2 The NML has not received any strain numbers from Nova Scotia for 2004.
3 Percentages were calculated using the number of specimens tested as the denominator.

Limitations

- While the introduction of NAAT has improved testing for gonorrhea and chlamydia (less invasive and easier specimen transport), phenotypic antimicrobial testing can only be performed on cultures.
  - The percentage of strains tested has been decreasing steadily since NAAT was introduced around 1997.
- For the first time in 2004, the NML tested less than half of the reported cases of gonorrhea for gonococcal resistance (Table 4).
  - This reduction in testing implies that current figures are not necessarily representative of the true burden of resistance.
- Because participation in surveillance is voluntary and the submission of samples is not standardized across the country, the current reported rates may not truly reflect the national picture[33].

Table 3. *Neisseria gonorrhoeae* isolates tested for antimicrobial resistance in Canada, 1999-2004

Year	Reported Cases	Strains Tested Nationally	%
1999	5,381	4,025	75
2000	6,189	4,458	72
2001	6,756	4,501	67
2002	7,365	4,465	61
2003	8,242	4,235	51
2004*	9,234	4,018	44

*Note: NML has not received any strain numbers from Nova Scotia.
Source: Public Health Agency of Canada, National Microbiology Laboratory, 2005.

Discussion

In 1997, Canadian STI goals were established to target the elimination of locally transmitted gonococcal infection or to maintain an incidence rate of less than 5 per 100,000[31]. With the current national rate almost 6 times higher than the target, prevention and control strategies need to be refocused and renewed.

National surveillance data, though limited, highlight populations that are disproportionately affected by gonorrhea. For males, the bulk of cases continues to be in the 20 to 29 year age category, but a shift towards an older population occurred in 1998 when rates among 30 to 39-year-olds surpassed those among the 15 to 19 year group[49]. The shift in the male-to-female ratio may reflect an increase in male-to-male transmission[50]. Note that this is difficult to verify since sexual preference data are not routinely reported as part of national surveillance. These two factors echo trends in the resurgence of syphilis.

While men account for approximately two-thirds of national gonorrhea cases, a subpopulation of women is disproportionately affected: young women, 15 to 24, form the vast majority of female cases. Women infected with gonorrhea are more likely to be asymptomatic and unaware of their infection; thus they may not seek medical attention. As a result, reported cases likely underestimate the true burden of infection in this population. This is one factor that should be taken into consideration when developing targeted, gender-based prevention programs.

The introduction of NAAT has allowed for the collection of urine samples as opposed to the traditional invasive urethral/cervical swabs. This may have encouraged more males to consent to testing. However, if NAAT were solely responsible for the upsurge, a levelling off in rates would be expected, since transmission would be subsequently reduced by improved detection and treatment. The absence of a plateau, coupled with the trajectories of other reportable STIs in Canada, indicates that other factors are at play. Increases in risky sexual behaviour, lack of knowledge regarding STI/HIV transmission, especially in young people, and a more relaxed attitude in relation to safer sex practices are likely contributing factors and need to be further investigated in order to better target prevention efforts.

Regional outbreaks are in part driving the national increase. Yukon saw a spike in cases in 2004, resulting in the initiation of a public health campaign of information and condom provision to reduce the transmission of gonorrhea[51]. Outbreak investigation

studies conducted in both Alberta and Manitoba identified geographic variations in the gonorrhea epidemic. The highest rates of infection were found in the urban core and northern/remote regions. Common concerns in the urban core included low socio-economic status, high unemployment rates, substance use and tenuous access to healthcare[52,53]. Issues specific to Aboriginal populations, such as governance and unique cultural constructs, as well as uneven access to public health services, poverty and alcohol abuse were cited as challenges in the northern/remote regions of Manitoba[52]. These factors likely reflect the situation in remote regions elsewhere in Canada. It appears that in many instances a network of people with high STI rates and frequent partner changes is contributing to incidence levels[33,54].

Measures to control the spread of antimicrobial-resistant gonorrhea include timely and accurate diagnosis, judicious and appropriate use of existing recommended treatments as well as methods to enhance patient adherence to treatment and innovative partner notification strategies. Ongoing and timely surveillance of antimicrobial resistance is essential to monitor resistant strains of gonorrhea in order to guide effective treatment recommendations for health care practitioners. Linking laboratory data to epidemiologic data allows for a more complete and representative picture of the otherwise concealed nature of gonorrhea resistance in Canada. This can be useful not only in informing treatment guidelines but also in identifying subpopulations at higher risk of infection with antimicrobial-resistant strains and in tracking whether cases are acquired locally or abroad. This is important information for clinicians and public health practitioners alike.

INFECTIOUS SYPHILIS

(*Treponema pallidum*)

Key Points:

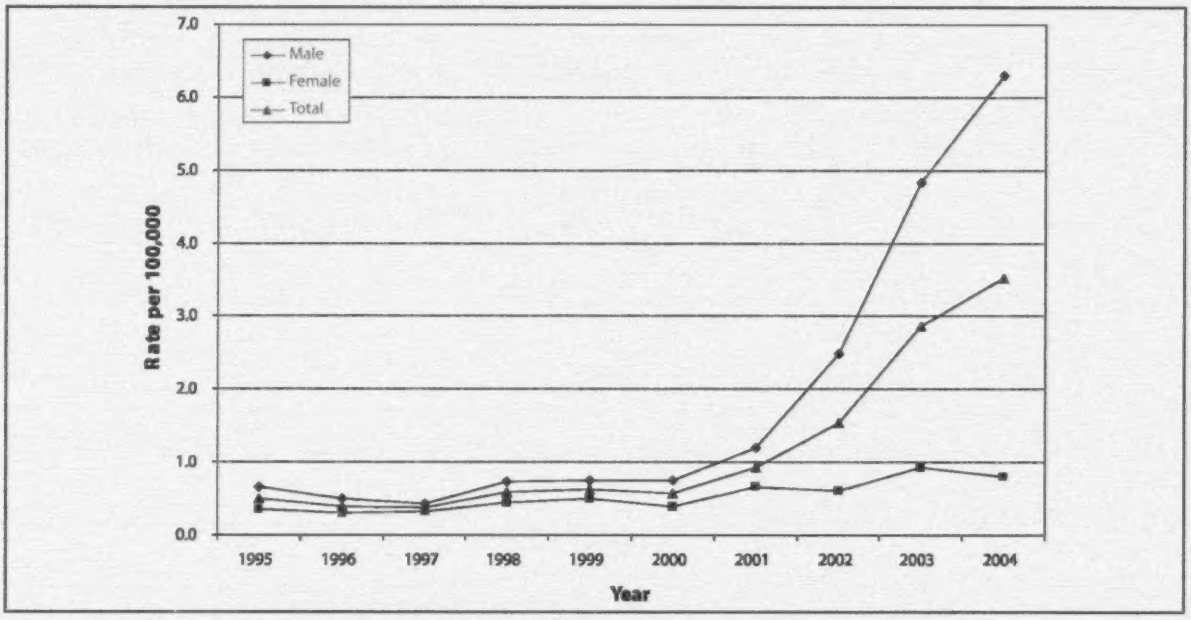
- ***The reported rate of infectious syphilis increased 9-fold between 1997 and 2004 (from 0.4 to 3.5 per 100,000).***
- ***Males over 30 years of age account for the majority of cases.***
- ***The availability of optimal treatment continues to be an issue in the control of infectious syphilis in Canada.***

- In Canada, "infectious" syphilis includes primary, secondary and early latent (< 1 year) stages[33].
- Primary syphilis is characterized by one or more painless ulcers (chancres) occurring at the site of inoculation, which often go unnoticed. These may be present approximately a month after exposure to syphilis and will resolve without treatment.
- Secondary syphilis occurs approximately 1 to 2 months after the primary lesion has resolved. It may be characterized by a variety of symptoms including rash, fever, malaise, headache, lymphadenopathy, mucous lesions, condyloma lata (wart like lesions) and alopecia.
  - Symptoms of secondary syphilis, if they occur, usually subside within a few weeks, but there is a chance of relapse of symptoms for up to 1 year.
- Early latent syphilis is considered to be infectious for up to 1 year because of the possibility of relapse to the secondary stage.
- Infectious syphilis can be transmitted from a mother to her child during pregnancy or delivery, leading to fetal death or congenital syphilis.
- Untreated syphilis will enter into a late latent stage of the infection and may never cause complications. It can, however, lead to serious complications associated with tertiary syphilis, including damage to the central nervous system, cardiovascular system, eyes, skin and other internal organs[42,55].
  - Untreated syphilis can be fatal.
- Individuals infected with syphilis are at increased risk of contracting and transmitting HIV and other STIs[56].
- Although infectious syphilis remains the least commonly reported STI in Canada, rates have risen dramatically since their low point in 1997 (Figure 1).
  - The overall rate in 2004 more than doubled from 2002 and was over 9-fold higher than in 1997.
- Unlike other STIs, which are disproportionately reported among young people, the largest burden of syphilis is in older age groups.
- Since 1997, syphilis outbreaks have been reported from cities across the country including Vancouver, Calgary, Edmonton, Winnipeg, Toronto, Ottawa and Montreal; outbreaks have also been reported in the Yukon[57-64].

Sex and age distribution

- Historically, there have been more reported cases of infectious syphilis among men than women. This distribution continued in 2004 (Figure 2).
- The ratio of male-to-female cases has been steadily increasing since 1997.
  - In 2004 the male-to-female ratio was approximately 8:1, as compared with 4:1 in 2002 and 1.3:1 in 1997.
  - Males accounted for 88% of cases in 2004.

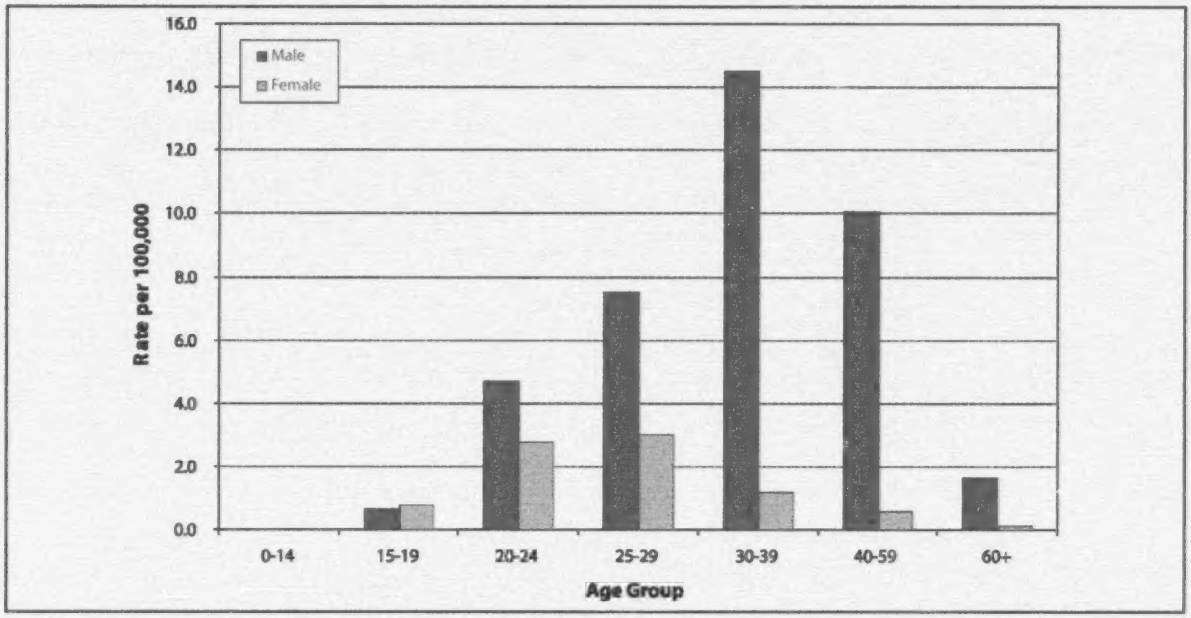
Figure 1. Reported rates[1] of infectious syphilis in Canada, 1995-2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Figure 2. Reported rates[1] of infectious syphilis by sex and age group, 2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

- In 2004, reported rates among males had more than doubled compared with 2002 and increased by over 13-fold since 1997; rates among females increased by 33% and more than doubled respectively for the same periods.
- Overall, the age distribution has been shifting towards the older age groups.
  - In the mid-1990s the highest reported rates shifted from those under to those over 30 years[65].

Males

- In 2004, 86% of male cases occurred in those aged 30 years and older.
- The highest rates among males in 2004 were in 30 to 59-year-olds (Figure 3).
- Rates increased in all age groups between 1997 and 2004 (Table 1).
  - Since 1997, male rates in the 30 to 59 year age group have increased almost 14-fold.

Table 1. Reported rates[1] of infectious syphilis among males: % increase 1997-2004[2]

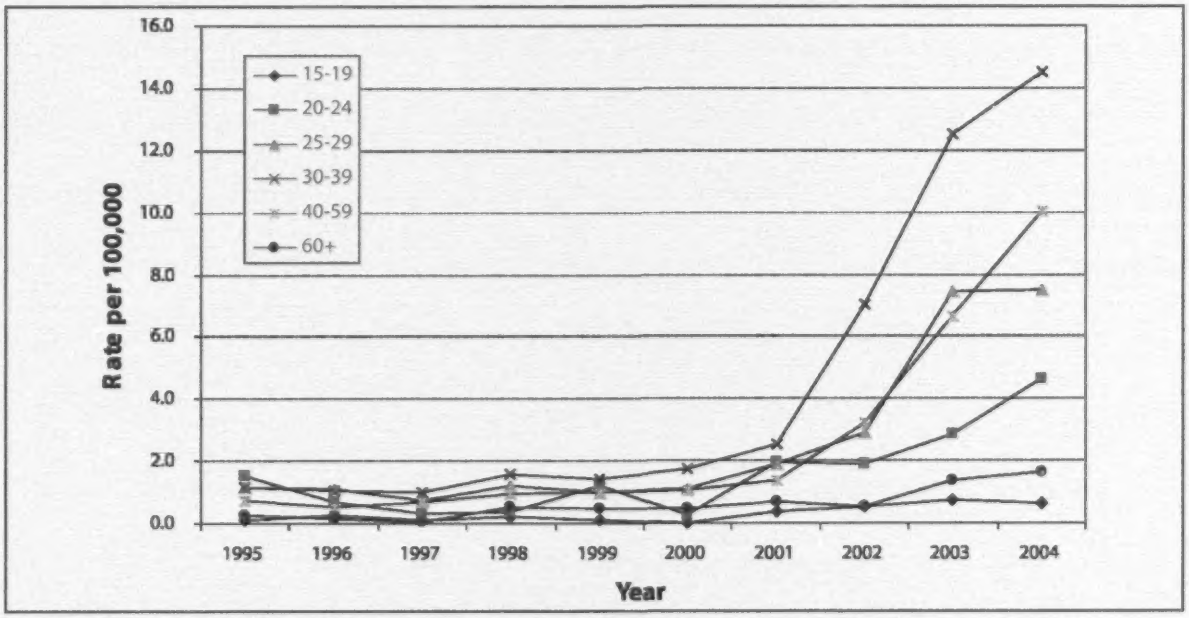
Age	1997	2004	% Change
15-19	0.1	0.6	570
20-24	0.3	4.7	1,503
25-29	0.7	7.5	918
30-39	1.0	14.5	1,356
40-59	0.7	10.0	1,394
60+	0.0	1.6	3,404
Total	**0.4**	**6.3**	**1,339**

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

- The age distribution among male cases has shifted towards older age groups.
  - Before 1995, the highest rates were seen in males aged 20 to 24 years.
  - Since 1995, those 30 to 39 years old have had the highest rates.

Figure 3. Reported rates[1] of infectious syphilis among males, by age group 1995-2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

- Between 2002 and 2004 there was a greater rate increase in the 40-59 year age group than the 30-39 year age group (209% vs. 107%).

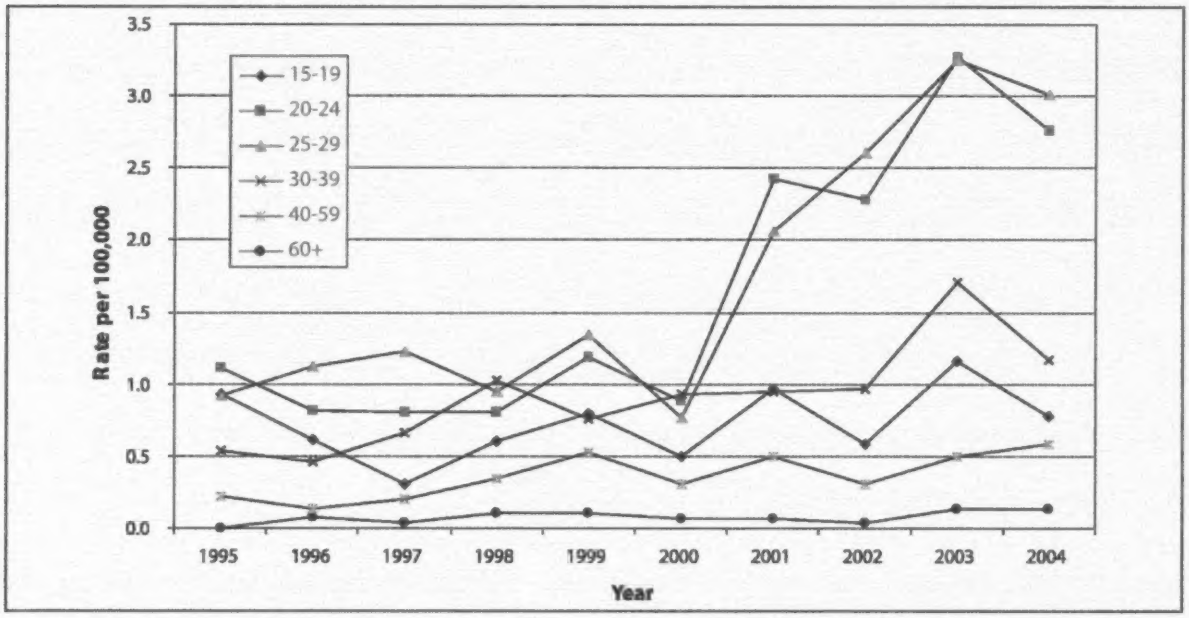
Men Who Have Sex with Men (MSM)

- Internationally, STI rates have been rising among MSM, and an increasing prevalence of higher-risk sexual activity has been observed in this population[66,67].
- Recent outbreaks of infectious syphilis in the MSM population have been investigated in Vancouver, Calgary, Ottawa, Toronto and Montreal [57,61,62,64].
- Between 1994 and 2001 the number of cases of infectious syphilis in Canada among MSM increased 8-fold[67].
- In the absence of information on the sex of partners, male-to-female rate ratios can be used as a surrogate measure to monitor the occurrence of syphilis among MSM[68].
  - The male-to-female rate ratio in 2004 overall was approximately 8:1, an increase from approximately 4:1 in 2002 and 1.3:1 in 1997, suggesting that male-male transmission was increasing over this period.

Females

- Female cases are more evenly distributed across age groups than male cases.
  - The age distribution of female cases has remained relatively stable since 1997.
  - In 2004, 48% of female cases were aged 20 to 29 years of age (Figure 4).
- In 2004 the highest reported rates were among 20 to 29 year olds (Table 2).
  - In 2004, the rates among females 20 to 29 years old were more than twice as high as the rates in 1997.
- Although decreases in female rates between 2003 and 2004 were seen for ages 39 and younger, the rate among females aged 40 to 59 appears to have increased slightly (Figure 4), which corresponds with the increases seen in this age group in males (Figure 3).

Figure 4. Reported rates[1] of infectious syphilis among females, by age group 1995-2004[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Table 2. Reported rates[1] of infectious syphilis among females: % increase 1997-2004[2]

Age	1997	2004	% Change
15-19	0.3	0.8	154
20-24	0.8	2.8	243
25-29	1.2	3.0	146
30-39	0.7	1.2	77
40-59	0.2	0.6	187
60+	0.0	0.1	252
Total	**0.3**	**0.8**	**142**

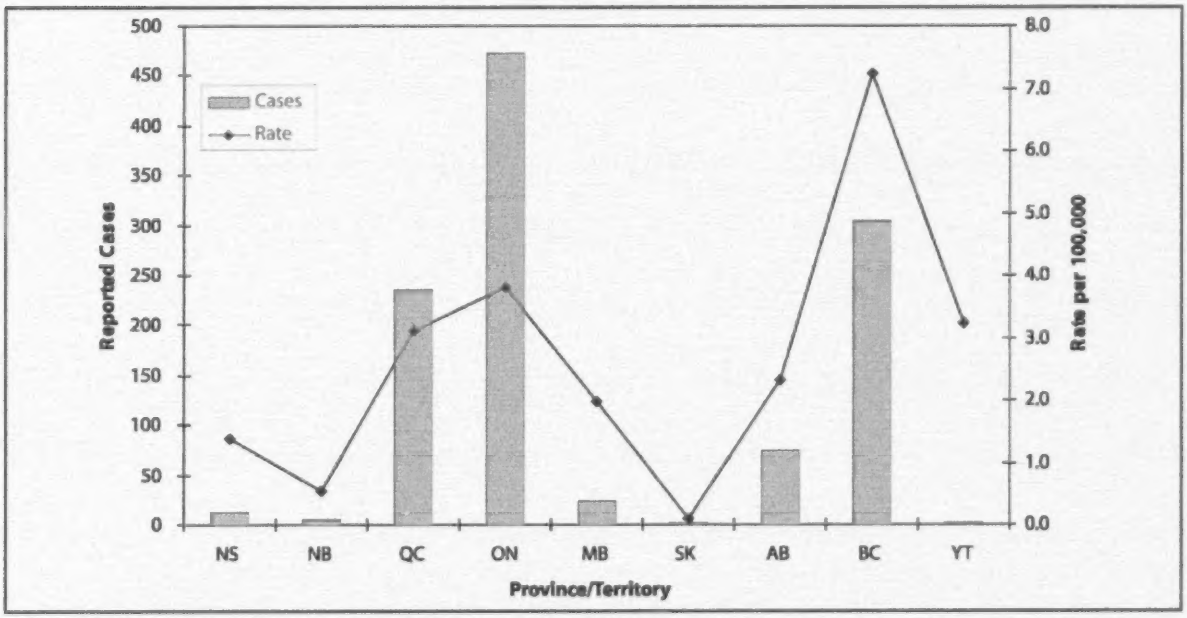
[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Geographic distribution

- The highest reported rate of infectious syphilis in 2004 was in British Columbia (7.2 per 100,000), and Ontario had the second highest reported rate overall (3.8 per 100,000).
- The majority of cases in 2004 were in Ontario (472 cases), British Columbia (304 cases) and Quebec (235 cases), which together accounted for almost 90% of all reported cases in Canada.
- Between 1997 and 2004, Quebec saw the largest increase in infectious syphilis rates, which rose from 0.1 to 3.1 per 100,000 (30-fold increase).
- The highest increases in rates between 2002 and 2004 were in Nova Scotia, followed by Alberta.
  - Alberta saw an 8-fold increase, from 0.4 to 2.3 per 100,000 (from 14 to 74 cases).
  - In Nova Scotia, rates increased from 0.1 to 1.4 per 100,000 (from one to 13 cases).
- In Yukon, rates decreased between 2002 and 2004, from 19.9 per 100,000 to 3.2 per 100,000 (from 6 cases to 1 case).
- In 2004, three provinces/territories (Newfoundland, Prince Edward Island, the Northwest Territories) reported no cases of infectious syphilis (Figure 5).

Figure 5. Reported cases and rates[1] of infectious syphilis by province/territory[2], 2004[3]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.

[2] Nunavut data unavailable.

[3] 2004 numbers are preliminary, and changes are anticipated.

- Prince Edward Island has reported no cases since 1994.

Geographic and sex distribution

- The highest reported rates for both males and females in 2004 were in British Columbia (10.9 and 3.7 per 100,000 respectively).
- Between 2002 and 2004, male infectious syphilis rates increased across all jurisdictions with the exception of Yukon; female rates increased only in Quebec, Manitoba, Alberta and British Columbia during the same period.
- Between 1997 and 2004, rates among males in Quebec showed the largest increase of any province/territory (50 times). Quebec also saw the greatest jump in female rates over this period, with a three-fold increase.
- Between 2002 and 2004, Nova Scotia saw the largest increase in male syphilis rates (12-fold), and the largest increase in female rates during this time was in Alberta (two-fold); case counts were small in both instances and must be interpreted with caution.
- In all jurisdictions that reported infectious syphilis cases in 2004, the male-to-female rate ratio exceeded 1, suggesting that male-male transmission was occurring[68].
  - In British Columbia, Alberta, Manitoba and New Brunswick the male-to-female ratio was between 2 and 4.
  - In Ontario and Quebec the male-to-female ratios were approximately 33 and 16 respectively, indicating a much higher rate of male-male transmission relative to male-female transmission.

Congenital syphilis

- Congenital syphilis occurs when a mother transmits the infection to her fetus transplacentally or during delivery if the newborn comes into contact with an active genital lesion[69].
- Syphilis can result in serious complications in pregnancy, such as spontaneous abortion, stillbirth or perinatal death; live-born infected children can suffer serious sequelae, usually within the first 3 months of life. However, some manifestations develop much later[55,69].
- Lack of prenatal care is the leading factor that accounts for failure to prevent congenital syphilis infection[69,70].
- Syphilis rarely complicates pregnancy in the Western world today[69]; however, some countries are seeing congenital syphilis cases as disease incidence increases among women[71].
- Cases of congenital syphilis in Canada are rare.
  - From 1995 to 2004 the number of cases has ranged from 0 to 2 per year.

Discussion

In contrast to gonorrhea and chlamydia, the two other notifiable bacterial STIs in Canada, cases of infectious syphilis are largely reported in older age groups (> 30 years) in both males and females. Like gonorrhea and chlamydia, rates of infectious syphilis have been steadily climbing since 1997. However, males have been disproportionately affected.

The data suggest that male-to-male transmission has been increasing since the mid-1990s. Syphilis outbreaks among MSM have been reported across the country, although heterosexual transmission is occurring, as is evident in the high reported rates among females in some jurisdictions. Heterosexual transmission related to the sex trade has also been reported.

It has been suggested that an increase in high-risk sexual behaviour among MSM may be the cause of rising syphilis rates among men. Anonymous partnering through the Internet and bathhouses, increased use of recreational drugs such as methamphetamine and Ecstasy, as well as a lack of awareness regarding oral transmission of syphilis may be contributing to increased transmission[65]. A recent study found rates of infectious syphilis to be highest among HIV-positive MSM who also reported high

levels of unprotected anal intercourse, both receptive and insertive, especially with casual partners[66].

In general, false perceptions that genital-oral and oral-anal practices are lower risk sexual behaviours may also be contributing to increased syphilis and other STI transmission[72]. "Safe sex fatigue", "condom fatigue" and lack of attention to traditional public health messages surrounding syphilis and other STIs may also be contributing factors to the increase in syphilis.

Primary syphilis infection, like gonorrhea and chlamydia, can go unnoticed. The painless primary chancre will resolve on its own without an individual being aware of the infection, which has important implications for control. This may be more of an issue when lesions are not easily visible, for example, in the case of anal or oral lesions or those that occur on the inside of the genital tract. Individuals with syphilis are at increased risk of acquiring other STIs and blood-borne pathogens, and are at increased risk of both contracting and transmitting HIV[56].

One of the many challenges faced in combating infectious syphilis in Canada currently is the availability of optimal treatment. Benzathine penicillin G is the recommended treatment of choice for syphilis. However, this drug is currently not marketed in Canada, and access to an international supply is restricted through Health Canada's Special Access Program. Alternatives to benzathine penicillin G are available but either have fewer efficacy data or raise patient compliance issues[33]. Single-dose azithromycin given orally has been shown to be effective in treating infectious syphilis[73]; however, resistance to this drug has emerged rapidly in Ireland, the United States and Canada[34,74,75].

The *Canadian Guidelines on Sexually Transmitted Infections 2006 Edition* recommend a post-treatment follow-up schedule for cases of infectious syphilis[33] to ensure that there is response to treatment and resolution of symptoms. Contact tracing must be carried out on all sexual and perinatal contacts within a specified period, depending on the stage of infection. Failure to follow-up with patients after treatment is common in some patient populations, and untraced contacts may lead to re-infection of the case[76] and infection of others. Barriers to partner notification are particularly problematic in the case of commercial sex workers and MSM who report frequent anonymous partnering, creating challenges for infection control.

Prevention and control efforts for syphilis in Canada have largely been ineffective in controlling the rising rates. A complex combination of risk factors are associated with infectious syphilis, especially in the sex trade and MSM populations. Locally relevant and multifaceted, innovative gender-based approaches to promotion, prevention and intervention strategies will be required to control this infection. Addressing common risk factors and behaviours associated with STIs and blood-borne pathogens can only enhance these efforts.

VIRAL STIs AND ENHANCED SURVEILLANCE

To provide a more complete picture of the transmission, acquisition and burden of STIs in Canada, this chapter addresses some infections that fall outside the scope of nationally reportable bacterial STIs[2]. Co-infection with multiple viral or bacterial STIs is common, especially in high-risk populations. Therefore, risk factors and populations that cross infections need to be taken into consideration when developing public health interventions.

Human immunodeficiency virus (HIV), a nationally reportable viral infection, has multiple modes of transmission, one of which is sexual contact. While detailed national surveillance data are published in a separate report, sexual transmission trends are highlighted here. Human papillomavirus (HPV) and herpes simplex virus (HSV) are both considered highly prevalent infections in the Canadian population with significant morbidity and sequelae. Compared with hepatitis B, sexual transmission of hepatitis C is usually inefficient except under certain circumstances.

Two national enhanced surveillance initiatives provide important information on an STI relatively new to Canada and a population which would likely not be captured in routine surveillance data. Lymphogranuloma venereum (LGV) is an emerging bacterial STI under enhanced surveillance. While the number of reported cases is relatively small, surveillance data assist in determining the epidemiology of the infection in Canada and appropriately targeting prevention and promotion messages. The Enhanced Surveillance of Canadian Street Youth (E-SYS) measures the rates of STIs, blood-borne pathogens and risk determinants in this high-risk population, which often has limited access to basic health care services and may be difficult to reach through school, telephone or other residence-based approaches.

Viral STIs

HIV

The presence of an ulcerative bacterial STI (e.g. syphilis or anogenital herpes) or non-ulcerative STI (e.g. chlamydia or gonorrhea) increases the risk of acquiring and/or transmitting HIV. In turn, HIV infection increases the risk of acquiring or transmitting an STI[33]. Increasing trends in bacterial STIs may be precursors to increases in HIV infection in certain populations due to the synergistic relationship between these infections. In addition, HIV trends and patterns of transmission are an important component to consider when interpreting STI trends in a given population.

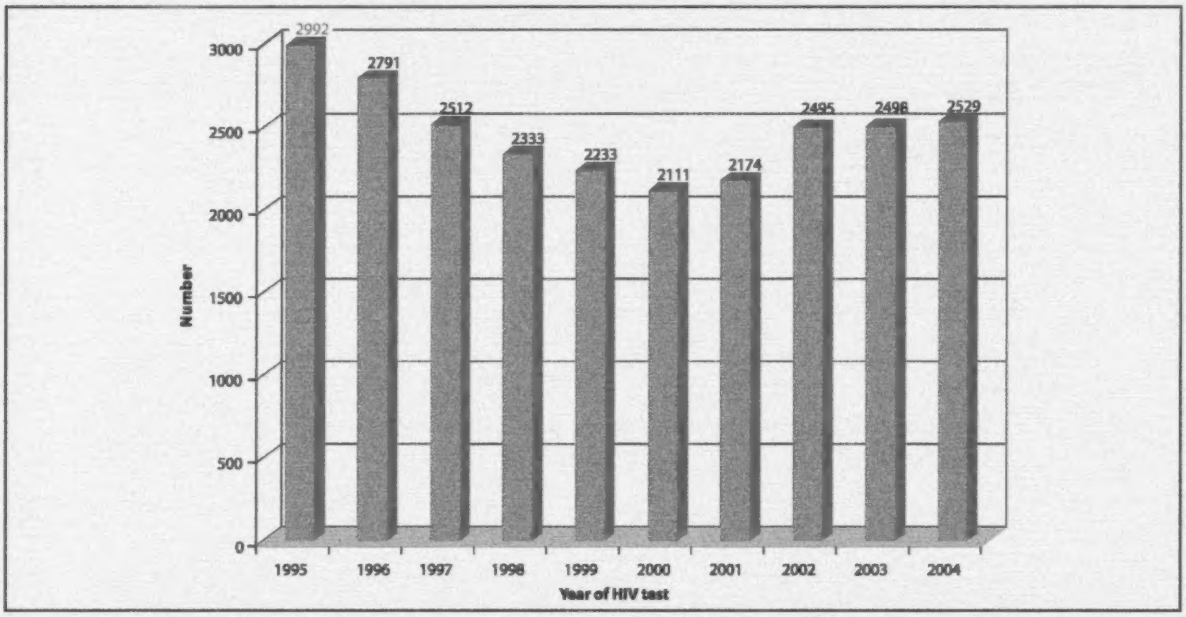
National surveillance of HIV is carried out by the Surveillance and Risk Assessment Division, PHAC, in cooperation with provincial, territorial and local partners. Semi-annual surveillance reports, summaries on specific topics (Epi Updates) and reports summarizing the estimates of HIV prevalence and incidence in Canada are also available. Statistics described in this section are reported in the *HIV and AIDS in Canada, Surveillance Report to December 31, 2004*[77].

2 From a practical perspective, not all infections can be under national surveillance. There are significant costs associated with surveillance, both in terms of human resources and the implementation of surveillance systems. Various research studies complement national surveillance by examining non-nationally reportable STIs and their public health implications.

- A total of 57,674 positive HIV tests were reported to the PHAC between November 1985 (when reporting began) and December 31, 2004.
- Positive test reports had been decreasing between 1995 and 2000 but increased in 2001 and 2002. Since 2002, test reports have remained steady at approximately 2,500 per year (Figure 1).
- The majority of HIV case reports are in males, however, females accounted for slightly greater than 25% of HIV case reports in 2004.
  - Before 1995 females accounted for less than 10% of positive test reports, but this has risen throughout the late 1990s and early 2000s.
- Individuals 30-39 years old accounted for the highest proportion of positive test reports in 2004, and this was true for both males and females.
- Sexual transmission accounts for a significant proportion of reported HIV cases.
- Approximately 45% of positive test reports in 2004 were in men who have sex with men (MSM), and this has been an increasing trend since 2001 (Figure 2).
- The heterosexual exposure category continues to account for a significant proportion of HIV-positive test reports (30% in 2004) and has surpassed intravenous drug use (IDU) as the second largest exposure category.
  - 25% of heterosexual positive HIV test reports in 2004 were from an HIV-endemic country, a number that has been increasing since 1998.
  - 40.5% of those in the heterosexual exposure category reported sexual contact with a person at risk.
  - 34.5% of heterosexual positive HIV test reports had no identified risk.
- Almost one-fifth of HIV-positive test reports had IDU as their exposure category.

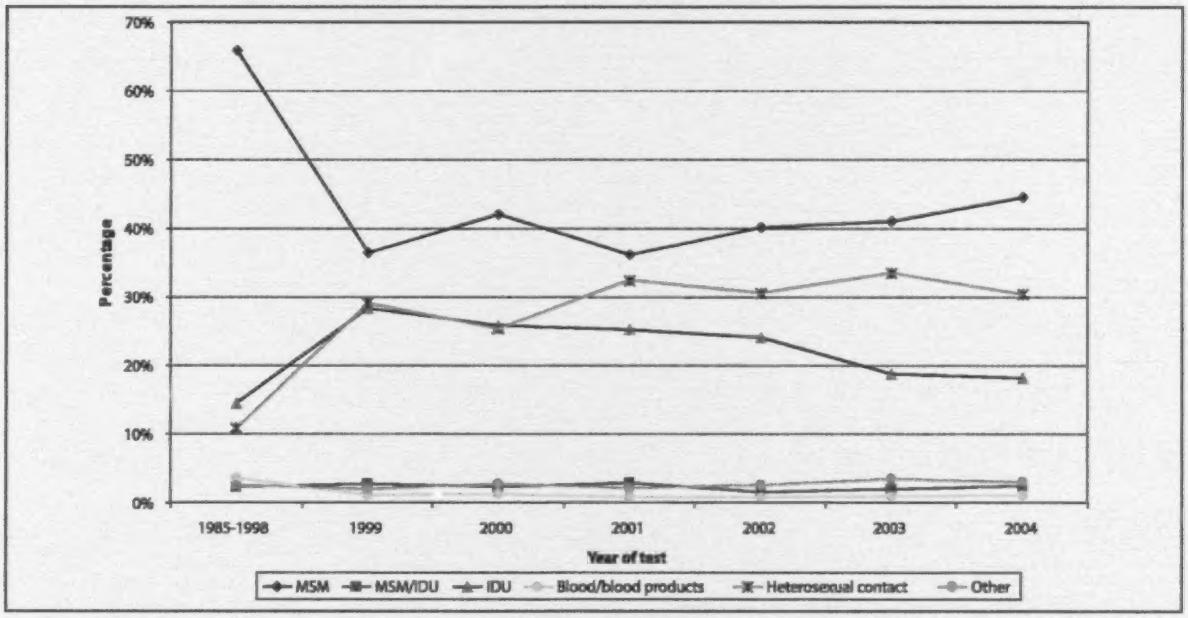
MSM continue to be at considerable risk for infection with HIV and other STIs. Risk factors include engaging in unprotected anal intercourse, both receptive and insertive, with casual or regular partners, and practising unsafe sex with a known HIV-positive partner[78]. A recent survey of MSM showed that 31% of HIV-negative and 63% of HIV-positive participants reported one or more

Figure 1. Positive HIV test reports by year of test, 1995-2004



Source: Surveillance and Risk Assessment Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.

Figure 2. Adult positive HIV test reports by exposure category, 1995-2004



Source: Surveillance and Risk Assessment Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.

episodes of unprotected receptive anal intercourse; 49% of HIV-negative and 43% of HIV-positive individuals reported unprotected insertive anal intercourse[72].

Human papillomavirus (HPV) and anogenital warts

- Based on published studies in Canada and the US, HPV is likely one of the most common STIs in North America[79-82].
- Over 100 different types of HPV exist, of which 35 or more infect the anogenital epithelium.
  - High-risk HPV may cause abnormal Pap smear results in women and could lead to cancers of the cervix, vulva, vagina, and anus. In men, cancer of the anus or penis may develop.
  - Low-risk HPV also may cause abnormal Pap results or anogenital warts[42].
- The most common high-risk (oncogenic) types include types 16 and 18, which account for approximately 70% of cervical cancers[83].
- Low-risk types 6 and 11 account for approximately 90% of anogenital warts[83].
- Testing for HPV in Canada is not routine, however, screening programs are in place to detect cervical abnormalities, pre-cancerous lesions and cervical cancer due to HPV infection in women.
- There are limited Canadian data on the incidence and prevalence of HPV infection and no published studies on the epidemiology of anogenital warts in Canada. Most studies focus primarily on HPV infection in women and its sequelae.
  - The burden of infection in females affects those under the age of 30 years[79,84,85].
  - Studies have found point prevalence rates of high-risk HPV among females overall ranging from 10.8% to 25.8% (population studied and testing methods vary)[79-81,84,85].
  - The prevalence of high-risk HPV among females 13 to 20 years of age in Nunavut has been found to be as high as 42%[84].

- The incidence of high-risk HPV among females 15 to 19 years of age was found to be 25% over a 14-month period[79].

- A vaccine against HPV types 6, 11, 16 and 18 for women has recently been licensed for use in Canada.
- Further HPV prevalence studies are currently under way in Canada. The design of a sentinel surveillance system for HPV is in progress to establish baseline measures of HPV prior to the introduction of the vaccine and to monitor future trends.

Anogenital herpes simplex virus (HSV)

- Anogenital HSV is of major public health importance. Not only is infection associated with significant morbidity, but herpetic lesions may also facilitate the transmission of HIV[86,87].
- Anogenital HSV infection caused by either HSV-1 or HSV-2 can cause vesicular lesions and painful ulcers that may recur at intervals[86].
- Many HSV infections are asymptomatic, and asymptomatic shedding of the virus results in transmission. Suppressive therapy may help to reduce silent shedding and transmission, but there is no known cure for HSV infection.
- Complications due to anogenital herpes infection include aseptic meningitis and other neurological complications, extra-genital lesions and disseminated infection[42].
- Perinatal transmission of HSV from a mother to her child may occur in utero, during or after birth, and may have devastating consequences[86,87].
- The prevalence of anogenital HSV increased markedly throughout the world during the 1980s and 1990s[42]; however, Canadian data on HSV seroprevalence are quite limited.
  - A population-based study of women in British Columbia in 1999 found an age-adjusted seroprevalence of 58.9% for HSV-1 and 17.3% for HSV-2[86].
  - In a low-risk population in Ontario between 2000 and 2001, age-standardized seroprevalence rates (males and females combined) of 51.1% and 9.1% were found for HSV-1 and HSV-2 respectively[88].
  - Among STD clinic attendees in Alberta between 1994 and 1995, HSV-1 seroprevalence was found to be 56% and HSV-2 seroprevalence was found to be 19%[89].
- A 3-year enhanced surveillance study was conducted to determine the incidence, determinants, and morbidity and mortality rates of neonatal herpes simplex virus (NNHSV) in Canada[87].
  - About 20 cases were detected a year (5.9 cases per 100,000 live births).
  - Of cases with known HSV-type, 62.5% were HSV-1.
  - 40% of mothers were unaware of their HSV infection prior to delivery and obvious genital lesions were rarely present.
  - These results have clear implications for prenatal prevention of neonatal HSV infection.

Sexually transmitted hepatitis C virus (HCV)

The role of sexual transmission in the spread of HCV has been a matter of debate and dissention for many years. Although it appears that sexual transmission under most circumstances is inefficient, some studies have highlighted increased HCV incidence among MSM and in particular those who are HIV-positive.

- Studies have suggested that HIV infection and/or certain sexual behaviours are major risk factors for sexual transmission of HCV[90-92]:
  - Unprotected receptive anal intercourse
  - Fisting
  - Having a sexual partner with a history of IDU
  - Anogenital herpes
  - HIV infection
  - > 20 sexual partners in the previous year
  - > 100 lifetime sexual partners.

- In one study, two-thirds of all HCV seroconversions occurred in non-IDU engaging in high-risk behaviours, suggesting that certain sexual practices may have a role in the transmission of HCV[93].
- Biological evidence shows that HCV can be detected in semen using molecular techniques and adds further weight to the argument that sexual transmission may play a role in the spread of the virus[91].
- The Enhanced Hepatitis Strain Surveillance System (EHSSS), a population-based system that was initiated in October 1998 in Canada, collects detailed information on risk factors, including sexual transmission, for newly acquired cases of HCV.
  - EHSSS data to 2004 suggest that a small proportion (6%) of newly acquired HCV infections in Canada may be related to sexual transmission[94].

Hepatitis B virus (HBV)

Although HBV is the most common cause of sexually transmitted hepatitis, it is also a vaccine preventable disease. For information on the epidemiology of HBV and on the HBV vaccine please consult the *Canadian Immunization Guide*[95], available online at http://www.phac-aspc.gc.ca/publicat/cig-gci/index.html.

Enhanced surveillance

Lymphogranuloma venereum (LGV)

- Until recently, LGV was rare in industrialized countries and was usually acquired in endemic countries.
  - LGV is endemic to parts of Africa, Asia, South America and the Caribbean.
- In 2003, cases were reported in MSM in the Netherlands and more recently elsewhere in Europe and North America.
- LGV is not a nationally reportable infection in Canada. In light of the increase in cases seen in North America and Europe, however, the PHAC, in partnership with the provinces and territories, established an enhanced national surveillance system for LGV in February 2005.
- LGV is a sexually transmitted infection caused by *Chlamydia trachomatis* serotypes L1, L2 and L3. Unlike chlamydia serovars A-K, which cause the more common genital infection and conjunctivitis, LGV serovars are invasive, preferentially affecting the lymph tissue.
- LGV can be transmitted through vaginal, anal or oral sexual contact.
- LGV is commonly divided into primary, secondary and tertiary (chronic, untreated) stages.
  - The incubation period for primary LGV is 3 to 30 days; it is characterized by small, painless papule(s) at the site of inoculation that may ulcerate, are self-limiting and may go unnoticed.
  - Secondary LGV usually begins within 2 to 6 weeks of the primary lesion, usually presenting as proctitis with inguinal and/or femoral lymphadenopathy; it may involve bloody, purulent or mucous anal discharge and systemic symptoms such as fever and malaise.
  - Tertiary LGV leads to chronic inflammatory lesions that cause scarring, lymphatic obstruction and rectal strictures and can cause extensive destruction of the genitalia.
- Between February 2005 and August 2006, 79 cases of LGV were reported to PHAC; 42 were confirmed cases and 37 were probable cases.
  - Of the reported cases, date of onset ranged from November 2001 to June 2006 (where information was available) (Figure 3).
- All reported cases have been male. The majority have been in Caucasian MSM between the ages of 21 and 62 (Table 1).

Figure 3. Epidemiologic curve for LGV cases in Canada where symptom onset date known, reported up to August 2006

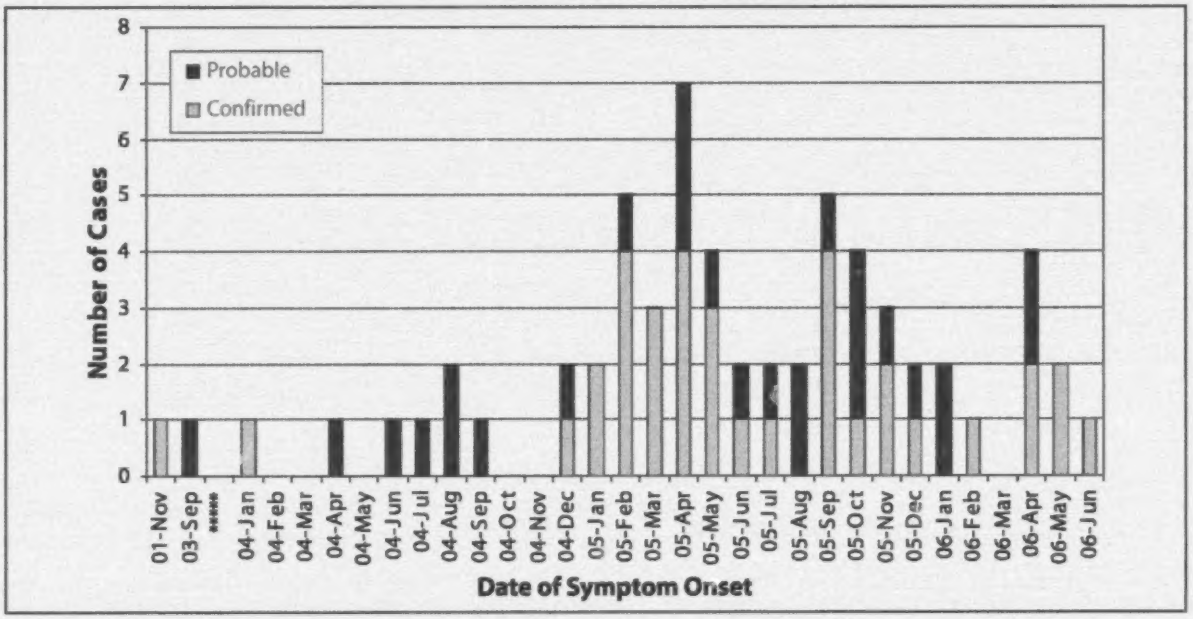


Table 1. Summary of demographic data for 79 reported cases of LGV in Canada

Feature	No. of cases (%)
Male	79/79 (100)
Ethnicity	
Caucasian	30/36 (83.3)
Asian	1/36 (2.7)
Caribbean	1/36 (2.7)
South American	4/36 (11.1)
Age range, years	21-62
Mean age, years	38.6

- Frequently reported sexual behaviour and risk factors are as follows:
  - Over 90% have reported recent receptive or insertive anal or oral contact, often unprotected.
  - The majority of cases reported sexual activity in a bathhouse or private residence; Internet partnering was frequently reported.
  - Fisting and rectal use of crystal methamphetamine has been reported by a small number of cases (< 10%).
  - Recent travel within Canada was reported by five cases; an additional five cases reported travel to endemic regions or areas reporting outbreaks outside Canada, including France, Mexico, Cuba and Jamaica.
- Co-infection with HIV (78%), HSV (26%) and HCV (14%) was also reported.

For further updated information, please refer to the PHAC LGV Epi Updates: http://www.phac-aspc.gc.ca/publicat/epiu-aepi/std-mts/lgv_e.html

STI in street youth: Enhanced Surveillance of Canadian Street Youth (E-SYS)

- E-SYS is a multi-centre sentinel surveillance system that monitors rates of STIs, blood-borne pathogens, behaviours and risk determinants in the Canadian street youth population[95].
- Compared with youth in the general Canadian population, higher rates of STIs and blood-borne

pathogens have been reported in street youth (Table 2)[96].

- Bacterial STI rates among street youth are on the rise, which is consistent with the national trends in the general population (Table 1).

1Rates in street youth are prevalence rates; the rates they are compared with in the general youth population (in brackets) are derived from reported cases.

- HSV-2 prevalence among street youth increased from 14.2% to 18.8% between 2001 and 2003.
  - Higher rates of HSV-2 were found among females than males.
  - Street youth 20 to 24 years of age had higher rates of HSV-2 than those aged 15 to 19 years.
- As with HSV-2, HSV-1 prevalence among street youth increased from 2001 to 2003 (56.0% to 60.8%), and rates were higher among females and older street youth overall.
- High rates of hepatitis C were found in street youth (approximately 4.0%), although the rates did not change significantly between 1999 and 2003.
- The prevalence of HIV among street youth was approximately 1%.
  - The burden of infection falls on older street youth (20 to 24 years), and there were no variations by sex. However, the case counts were small, and the results must be interpreted with caution.
- Testing was performed for human T cell lymphotropic virus (HTLV) in 2001 and 2003. In each year there was one laboratory-confirmed case of HTLV-1.

For further information and publications on E-SYS, please refer to the PHAC Sexually Transmitted Infections Web site: www.publichealth.gc.ca/sti

Table 2. Rates[1] of genital chlamydia, gonorrhea and infectious syphilis among street youth and in the general youth population in 1999, 2001 and 2003

Age	1999 (%)	2001 (%)	2003 (%)
Genital Chlamydia			
15-19 years	8.98% (0.65%)	11.51% (0.74%)	10.88% (0.82%)
20-24 years	7.87% (0.75%)	11.38% (0.88%)	11.04% (0.99%)
Gonorrhea			
15-19 years	1.56% (0.06%)	1.04% (0.07%)	2.19% (0.08%)
20-24 years	0.90% (0.07%)	2.12% (0.09%)	4.38% (0.10%)
Infectious Syphilis			
15-19 years	—	0% (< 0.01%)	0.25% (< 0.01%)
20-24 years	—	0% (< 0.01%)	1.31% (< 0.01%)

[1] Rates in street youth are prevalence rates; the rates they are compared with in the general youth population (in brackets) are derived from reported cases.

PROJECTED TRENDS OF STIs IN CANADA

Surveillance data are collected to inform and direct public health action. Examining secular trends provides a measure of direction: Are rates increasing, decreasing or stable across particular populations? Inherently, part of the interpretation of such data is to extrapolate the trend into the future, which can then assist in the planning and implementation of prevention and control measures.

In this chapter, the trends of all three reportable bacterial STIs are assessed. Rates were projected for the years 2005 to 2010 to provide a concrete example of what STI rates in Canada may look like in the absence of a substantive shift in the epidemic. These examples may further assist with the broad planning of prevention and control activities and the allocation of resources.

Reported rates of gonorrhea, genital chlamydia and infectious syphilis were in decline in the early 1990s, reaching a nadir around 1997, about the time that the national STI goals were set. At this time there was a resurgence in all three reportable STIs, which continues unabated. For a detailed discussion of current trends within each STI, please see the particular infection chapter.

Methods

The numbers of reported cases of gonorrhea, chlamydia and infectious syphilis by sex, province/territory and year of diagnosis were available from 1980, 1992 and 1993, respectively. Recent trends in gonorrhea and chlamydia rates were estimated using a simple Poisson regression model for the current period starting with the 1997 resurgence. Poisson regression, which is similar to linear regression, accounts for the error distribution of count data and incorporates the population at risk[97]. As Poisson regression uses a logarithmic linking function, the estimated trend is the average annual percentage change. Trends were plotted for graphical representation. The trend line for historic data was added using a similar model, and error bars representing 95% confidence intervals (CI) of the mean predicted were included.

The assumption of a steady increase in rates was not suitable for infectious syphilis rates, particularly for males. As syphilis is usually characterized by local outbreaks and annual rates appeared to be highly clustered, trends were not summarized for syphilis.

Limitations

This model does not attempt to take into account the many factors that may influence the direction of the epidemic, such as changes in risk behaviour and laboratory advances. For example, while studies showing increases in risky sexual behaviour are consistent with the observed trends in STI rates, the projections do not take into account any effect that recent changes to risk behaviour might have or whether the resurgence is self-limiting.

Further, these projections are based on the number of reported cases only, and there is an inherent under-reporting associated with passive surveillance systems. For example, because some infections are asymptomatic and individuals may not present to the health care system, reported cases are known to underestimate the actual incidence and prevalence of disease.

Confidence intervals are used to reflect the uncertainty in the estimation of the past trend. Hence, projected estimates provide a general benchmark that can be used to assess whether the resurgence is slowing.

Results

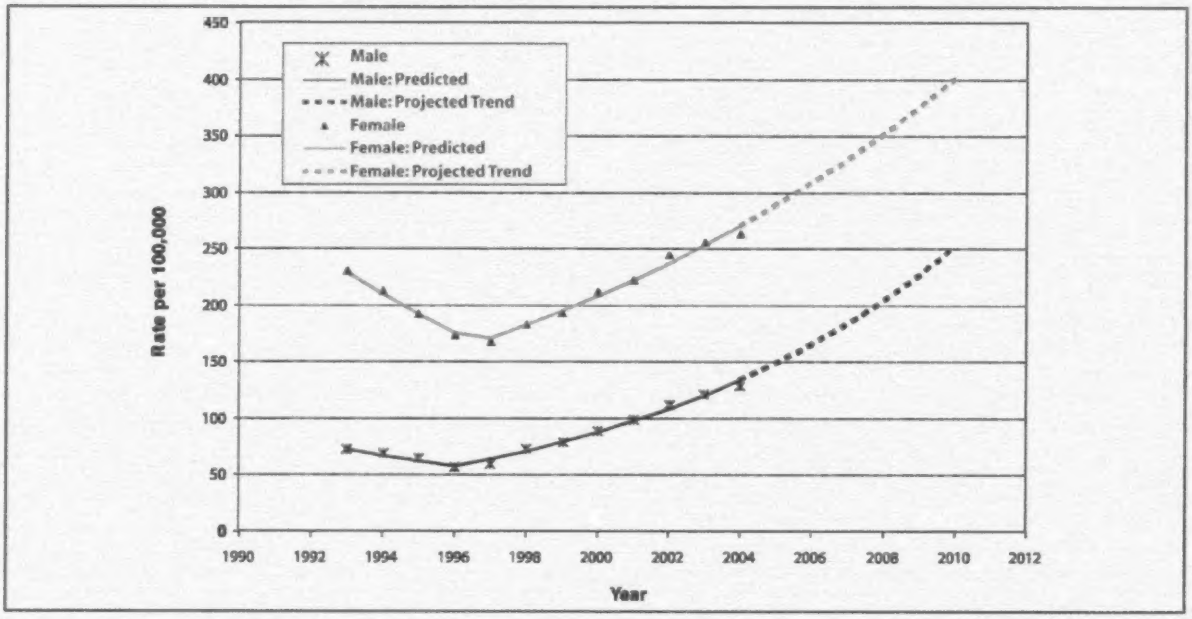
Genital Chlamydia

- After declining since the early 1990s, reported rates of genital chlamydia have increased by an average of 11% (95% CI 10% to 12%) per annum among males and an average of 6.8% (95% CI 6.6% to 7.0%) per annum among females since 1997.
- Rates among males increased more rapidly than among females in all jurisdictions and in all age groups over 15 years.
- If these increases continue, the overall rate could reach over 320 per 100,000 by 2010, for an increase of over 60% from 2004 and over 180% from 1997.
  - The projected rate among males in 2010 would be over 250 per 100,000, an increase of almost 95% from 2004 and of 330% from 1997 (Figure 1).
  - The projected rate among females in 2010 would be around 400 per 100,000, an increase of more than 50% from 2004 and almost 140% from 1997 (Figure 1).
- Although predicted rates between 2005 and 2010 remain higher among females, the gender gap continues to narrow (male-to-female case ratio for 2010 would be 1:1.6 vs. 1:2.1 in 2004).

Gonorrhea

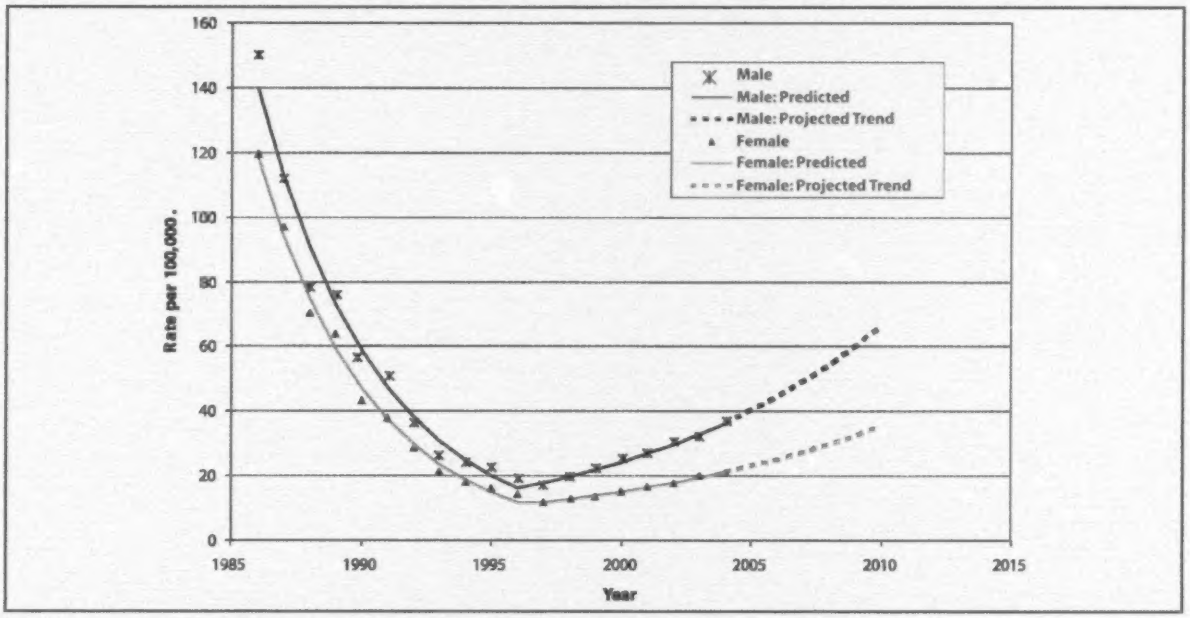
- After plummeting in the early 1980s to the late 1990s, reported gonorrhea rates have increased at an average rate of 10.6% (95% CI 10.1% to 11.2%) per year among males and at an average rate of 8.9% (95% CI 8.2% to 9.6%) among females.
- The increase in male rates was stronger than in females in all jurisdictions except Manitoba.
- At this rate of increase, gonorrhea rates would reach over 50 per 100,000 by 2010, an increase of almost 75% from 2004 and over 240% from 1997.
  - The projected rate among males in 2010 would be over 66 per 100,000, an increase of

Figure 1. Reported rates[1] of genital chlamydia in Canada, projected to 2010[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

Figure 2. Reported rates[1] of gonorrhea in Canada, projected to 2010[2]



[1] Rate per 100,000 population. Population estimates provided by Statistics Canada.
[2] 2004 numbers are preliminary, and changes are anticipated; Nunavut data unavailable.

greater than 80% from 2004 and more than 270% from 1997 (Figure 2).

- The projected rate among females in 2010 would be over 35 per 100,000, an increase of greater than 67% from 2004 and almost 195% from 1997 (Figure 2).

- If male rates continue to increase faster than female rates, the proportion of male cases would further increase marginally from 63% in 2004 to 65% by 2010.

Infectious syphilis

As of 2004, the syphilis rate among males was over 10 times the rate in 1997; the female rate more than doubled during the same period. Since these increases were likely due to regional outbreaks, projections were not made for syphilis. While an underlying trend for syphilis could be similar to that of gonorrhea and chlamydia, year-to-year variation would be expected to be much larger because of intermittent regional outbreaks as well as sustained outbreaks in other jurisdictions.

Discussion

Rates of all reportable STIs have been rising since 1997 despite localized efforts to combat these infections. If current trends persist, rates will reach even more daunting heights by the end of this decade.

Gonorrhea rates in 2004 were as high as rates in 1992, when decreases were being observed. If current trends persist, rates for 2010 would match those seen in the late 1980s. The rates of genital chlamydia have already surpassed the previous high that was seen when chlamydia first became nationally reportable in the early 1990s. It is of particular concern that trends in bacterial STI rates are likely a leading indicator of the sexual transmission of HIV, particularly where both male and female rates are increasing[58].

In 1997, national goals were developed by the federal/provincial/territorial STI directors together with a group of national and international STI experts. The goal was to contextualize Canadian STI rates, using the data to focus professional and public attention on the need to further reduce STI levels in Canada. Among the many goals resulting from this

meeting were specific incidence and/or prevalence targets for the three nationally reportable STIs for the years 2000 and 2010.

It is evident that the goals set in 1997 are no longer appropriate or feasible and that the failure to achieve them reflects a complex combination of factors underlying the trends in the opposite direction. A working group has been set up to develop an approach for reassessing the national STI goals, and the projected STI rates over the next 5 years will help to focus the discussions.

The recent economic burden of STIs in the Canadian context is not well documented, as the last published research dates back to the 1990s[90,99]. It seems likely that in Canada the current public health resources associated with testing, treating and conducting contact tracing for STI cases would outweigh the resources associated with prevention, promotion and curbing the current STI epidemic. In fact, it has been suggested that as the rates of STIs reach certain prevalence levels, it may be useful to re-assess the cost-benefit of using strategies employed at the peak of an epidemic, such as widespread screening and mass media campaigns[100]. To implement such action, the dedication of additional resources in a national strategy towards new STI prevention and control measures is needed.

That all three STI rates had a nadir in 1996-1997 suggests that prevention is possible. Ongoing, timely, representative surveillance and the collection of more detailed case information and data on antimicrobial resistance will be essential in efforts to curb these predicted increases. Multifaceted, population-specific, gender-based prevention, promotion and intervention tactics are integral components of any STI control strategy in Canada. Appropriate support and adequate resources are essential in order to ensure that any STI control program is successful. In addition, recognition that STIs and blood-borne pathogens such as HBV and HCV affect the same populations forms the basis of a broader disease control strategy. Following an integrated approach, which takes into account that these populations are at risk of multiple infections as a result of common factors and behaviours, makes more effective use of limited resources.

TECHNICAL NOTES

Commonly used terms/definitions

Asymptomatic

- Lack of symptoms of a sexually transmitted infection; symptom-free (the opposite of "symptomatic", see below).

Case

- A case is an individual in the population who has an infection that has been diagnosed (for our purposes, as an STI). Individuals may be a case more than once if they are re-infected (e.g. by an untreated partner). At the national level, all cases of STI are laboratory confirmed.

Case definition

- A combination of clinical, laboratory and epidemiologic criteria used to classify a diagnosis for the purposes of tracking and monitoring diseases by local, provincial/territorial and federal public health.
- For case definitions of STIs under national surveillance, refer to http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00pdf/cdr26s3e.pdf.

Gonococcal infection

- Another term for gonorrhea.

NAAT

- Nucleic acid amplification test. It is a relatively new method of testing for infection of various pathogens, including *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. Unlike previous methods, NAAT can be used on urine samples.

Outbreak

- The occurrence of a higher than expected number of cases in a population.

Rate

- A rate is calculated as the number of cases in a population (e.g. a geographic region or a specific sex) divided by the total number of people in that population.

  Rate per 100,000 population = (number of reported cases/population size) x 100,000

STD

- Sexually transmitted disease. This is the traditional term for infections that can be spread through sexual contact with an infected person. However, some STDs can be spread though non-sexual methods, such as injection drug use.

STI

- Sexually transmitted infection. This term is increasingly used in place of STD, since it is more encompassing and includes infections that may be asymptomatic.

Surveillance

- The ongoing collection, analysis and feedback of public health data that are collected systematically.

Symptomatic

- Showing the symptoms of a disease or infection.

National surveillance of sexually transmitted infections (STIs)

There are limitations associated with the analysis and interpretation of STI surveillance data, some of which are specific to the national level. The number of reported cases likely underestimates the true burden of infection in a given population. For a case to be counted, an infected individual must seek medical care and have a positive laboratory test. Because of the asymptomatic nature of bacterial STIs, many infected persons will not present to a health care provider and will remain part of the hidden epidemic. Additional cases may be identified through contact tracing of an individual whose infection has been diagnosed. However, the increasing prevalence of anonymous sexual partnering makes contact tracing more difficult.

When reviewing the results of analysis, caution must be used in interpreting statistics from regions with small populations. Rates based on small numbers are more prone to fluctuation. For example, a large percentage change may reflect very small changes in the absolute number of cases (may be unrelated to true changes in infection rate and be more difficult to interpret than data from larger populations).

Furthermore, many STIs are not nationally notifiable, limiting the overall picture of the incidence and prevalence of infections acquired through a common mode of transmission. While a more complete representation of STI may help direct prevention and control efforts, the resources required to implement such surveillance are prohibitive.

Technical differences between the provinces/territories and the PHAC may introduce barriers that can lead to delays in the timely reporting of surveillance data. Because many provinces/territories use different software to maintain their data, not all jurisdictions submit the same data elements, in the same format, to the national level. Some submit aggregate case counts (by age, sex and disease); others submit case-level data with age and gender information. Other fields such as risk factor information, however, are completed to varying degrees, and different values may be used in some fields (e.g. ethnicity).

There are several ways of minimizing or eliminating these limitations. All jurisdictional case counts and geographic analyses are reviewed by individual provinces and territories to ensure accuracy. Should a discrepancy exist, provincial/territorial data are considered definitive.

Work towards the use of standard data elements for reporting STIs to the federal level is ongoing. A series of federal/provincial/territorial consultations have been held to develop the core and minimum data sets. The core data set comprises data elements that are required for the surveillance of all nationally notifiable diseases (Table 1). A minimum data set for national surveillance of STIs has been proposed. It includes core data set elements as well as additional STI-specific data elements considered important for national STI surveillance (Table 2).

Table 1. National core data set for the routine surveillance of communicable diseases

Data element	Description	Justification
Health Related Event Date	**Used to estimate the onset date for an episode:** 1 = date of onset of symptoms; 2 = clinical diagnosis date (when health care professional made diagnosis); 3 = specimen collection date (when specimen, from which first laboratory confirmation of disease was derived, was taken); 4 = laboratory test result date (date of first confirmatory laboratory test result); 5 = date report completed by local health authority; 6 = date received at PHAC.	Information is required for analysis by person, place and time, enabling early alerting of disease events and enabling trend analysis, and developing capacity to respond. Information is used to target and implement appropriate prevention and control programs.
Health Related Event Date Code	Maps to the Health Related Event Date and defines which date was entered.	This data element is used in conjunction with the Health Related Event Date.
Disease	Code associated with the disease under national surveillance.	Consistent classifying and naming of diseases is crucial for comparing disease rates across jurisdictions and time.
Status	The level of certainty of the diagnosis at the time of presentation to the healthcare system: • laboratory confirmed • probable • possible/suspect Meets the criteria in the specific disease case definition.	The information is used to track changes in the level of certainty of diagnosis of the reported disease. Consistent recording of disease status improves data quality at the local and federal levels.
Forward Sorting Locator (FSL)	The first three characters of the provincial/territorial postal code. Census division can be used if postal code is unavailable.	Information is required for analysis by person, place and time, enabling early alerting of disease events and trend analysis, and developing capacity to respond. Information is used to target and implement appropriate prevention and control programs. Attribute is useful for GIS function.
Province	Name of province or territory of residence.	Information by province and territory enables calculation of the number of cases of a reportable disease for Canada; this number, in turn, enables the calculation of a national incidence rate.
Age	Age of person at time of disease/the health related event. Calculated to months for children less than 5 years of age and to years for all older individuals.	Information is required for monitoring trends and identifying exposure groups in outbreaks. Precise age data are important when recording events in young children and assessing vaccination status/effectiveness.
Estimated Age Indicator	Used when date of birth is unknown to indicate whether age provided has been estimated using other information.	Improves integrity of age data.
Sex	Reported sex of patient.	Information enables basic demographic profile.
Episode Identifier	Identifies episode record without identifying person. Replaces provincial/territorial unique identifier at federal level. Provinces/territories maintain correlation table that enables trace-back from episode identifier to person; this information is not available at federal level.	Information is required when transferring data between databases to ensure data integrity (i.e. to refer back to originating system when discrepancies arise). Ability to tie events to episode identifier is also key.
Organization Name	Name of organization responsible for reporting.	Information identifies agency of case for follow-up and contact tracing. Required for outbreak analyses.
Organization Code	Code assigned to organization name for identification purposes.	Identifies organization responsible for reporting.

Table 2. Proposed national minimum data set for routine surveillance of STIs

Data element	Description	Justification	STI
Demographics			
1. Race/Ethnicity (Note: Description, rationale and content standard require further discussion.)	Optimally self-identified, indicates race/ethnic group to which patient belongs: • Non-Aboriginal (to be defined) • Aboriginal (First Nations, Métis and Inuit)	Recognition that regional/federal data are limited. Needed to target prevention and treatment programs.	Chlamydia Gonorrhea Syphilis
Clinical Details			
2. Specimen and Site of Infection	The type of specimen collected and the anatomical site from which the specimen is collected resulting in laboratory confirmation of the infection. *Specimen type* — *Site of infection* Blood — Not required Urine — Not required Scraping — Cervix, urethra, rectum, throat, eye Swab — Cervix, urethra, rectum, throat, eye Other — Specify	Important as an indirect marker for risk behaviour and for tracking current screening practices.	Chlamydia Gonorrhea Syphilis
3. Staging	Indicates stage of infection. Based on *Case Definitions for Diseases Under National Surveillance 2000* (http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html). ▪ Primary ▪ Secondary ▪ Early latent ▪ Congenital ▪ Other (late latent, neuro or tertiary) ▪ Unspecified	Needed to track the stages at which cases are being diagnosed; important information in the provision of training and targeting of programs and resources aimed at promoting early identification.	Syphilis
Laboratory Details			
4. Antimicrobial Resistance	Reported only for cases of antimicrobial resistance. Identifies the drug to which the organism is resistant (list of drugs supplied by the National Microbiology Laboratory): ▪ Penicillin ▪ Spectinomycin ▪ Tetracycline ▪ Erythromycin ▪ Azithromycin ▪ Ciprofloxacin ▪ Cefixime ▪ Ceftriaxone ▪ Other (please specify)	Needed to monitor the spread of drug-resistant organisms. Used in the development of treatment guidelines and to initiate enhanced surveillance.	Gonorrhea

Case-by-case reporting by all provinces and territories would enhance the national picture of STI. Risk indicator data at the national level are currently incomplete, prohibiting in-depth analysis to assist in the interpretation of observed trends.

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APPENDIX I

Table 1.1 Reported Genital Chlamydia Cases and Rates[1] in Canada by Age Group and Sex, 1991-2004[2]

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
1991	Cases	Male	8,835	9	5	1	37	1,753	3,480	1,853	1,141	334	22	200
		Female	26,918	17	13	12	530	10,259	9,489	3,657	1,926	410	26	579
		Unspecified	10,216	0	0	0	1	8	10	5	0	1	0	10,191
		Total	45,969	26	18	13	568	12,020	12,979	5,515	3,067	745	48	10,970
	Rate	Male	63.6	4.3	0.6	0.1	3.8	176.9	327.6	145.9	46.2	10.4	1.1	
		Female	190.4	8.6	1.7	1.3	57.3	1,095.1	925.0	295.6	78.4	12.9	1.0	
		Total	164.0	6.4	1.2	0.7	29.9	623.4	621.6	220.0	62.2	11.7	1.1	
1992	Cases	Male	10,811	24	7	3	32	2,047	4,290	2,122	1,423	400	34	429
		Female	35,363	23	16	14	605	13,235	12,466	4,550	2,407	526	58	1,463
		Unspecified	191	0	1	0	0	9	18	6	3	0	1	153
		Total	46365	47	24	17	637	15,291	16,774	6,678	3,833	926	93	2,045
	Rate	Male	76.9	11.6	0.9	0.3	3.2	206.6	406.8	172.4	56.6	12.2	1.7	
		Female	247.1	11.7	2.1	1.5	64.5	1,412.1	1,225.6	378.7	96.3	16.1	2.3	
		Total	163.4	11.7	1.5	0.9	33.0	793.0	809.7	274.6	76.4	14.1	2.1	
1993	Cases	Male	10,621	9	4	6	51	2,077	4,132	2,250	1,490	451	27	124
		Female	33,379	18	11	11	600	12,744	12,012	4,558	2,542	500	40	343
		Unspecified	22	0	0	0	0	4	1	2	3	0	0	12
		Total	44,022	27	15	17	651	14,825	16,145	6,810	4,035	951	67	479
	Rate	Male	74.7	4.5	0.5	0.6	5.1	208.9	395.3	189.9	58.1	13.3	1.3	
		Female	230.5	9.4	1.4	1.2	63.0	1,355.0	1,194.2	394.4	100.0	14.8	1.6	
		Total	153.4	6.9	0.9	0.9	33.3	766.2	787.2	291.0	79.0	14.1	1.5	
1994	Cases	Male	10,006	20	2	4	33	1,914	3,859	2,022	1,544	460	38	110
		Female	31,176	27	13	13	577	11,567	11,282	4,165	2,669	589	40	234
		Unspecified	53	0	0	0	0	5	16	9	5	0	0	18
		Total	41,235	47	15	17	610	13,486	15,157	6,196	4,218	1,049	78	362
	Rate	Male	69.6	10.1	0.2	0.4	3.2	190.0	372.7	177.0	59.4	13.2	1.9	
		Female	212.8	14.4	1.6	1.4	59.8	1,215.5	1,131.8	373.6	103.8	16.8	1.5	
		Total	142.0	12.2	0.9	0.9	30.8	688.4	745.9	274.5	81.6	15.0	1.7	
1995	Cases	Male	9,085	24	6	3	21	1,721	3,478	1,848	1,484	398	33	69
		Female	28,451	32	5	10	466	10,704	10,496	3,745	2,312	459	31	191
		Unspecified	15	0	0	0	0	2	2	1	0	1	0	9
		Total	37,551	56	11	13	487	12,427	13,976	5,594	3,796	858	64	269
	Rate	Male	62.5	12.2	0.7	0.3	2.0	168.7	338.5	166.4	56.6	11.0	1.6	
		Female	192.0	17.2	0.6	1.0	47.9	1,111.1	1,060.2	345.4	89.4	12.6	1.2	
		Total	127.9	14.7	0.7	0.7	24.4	626.4	692.7	254.9	72.9	11.8	1.4	

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
1996	Cases	Male	8,317	9	1	0	23	1,524	3,128	1,745	1,372	436	22	57
		Female	26,062	14	9	14	435	9,752	9,439	3,549	2,134	530	26	160
		Unspecified	20	0	0	0	0	6	5	1	2	0	0	6
		Total	34,399	23	10	14	458	11,282	12,572	5,295	3,508	966	48	223
	Rate	Male	56.6	4.6	0.1	0.0	2.2	147.2	305.5	159.6	52.3	11.7	1.0	
		Female	174.0	7.5	1.2	1.4	44.5	997.1	956.7	331.7	82.6	14.1	1.0	
		Total	115.9	6.0	0.6	0.7	22.8	560.5	625.3	244.7	67.3	12.9	1.0	
1997	Cases	Male	8,714	7	0	0	18	1,510	3,260	1,783	1,559	484	21	72
		Female	25,406	15	3	10	378	9,588	9,170	3,458	2,103	512	33	136
		Unspecified	24	1	0	0	0	4	4	1	0	1	0	13
		Total	34,144	23	3	10	396	11,102	12,434	5,242	3,662	997	54	221
	Rate	Male	58.7	3.8	0.0	0.0	1.7	144.7	316.1	164.3	59.8	12.5	1.0	
		Female	167.8	8.7	0.4	1.0	38.5	971.3	924.1	325.8	81.9	13.2	1.2	
		Total	113.9	6.5	0.2	0.5	19.6	546.7	614.5	244.2	70.8	12.8	1.1	
1998	Cases	Male	11,041	8	0	3	36	1,934	4,094	2,338	1,934	609	32	53
		Female	27,956	12	7	12	413	10,599	10,087	3,857	2,299	509	29	132
		Unspecified	37	1	0	0	0	4	4	4	2	0	0	22
		Total	39,034	21	7	15	449	12,537	14,185	6,199	4,235	1,118	61	207
	Rate	Male	73.7	4.5	0.0	0.3	3.5	183.8	394.1	217.0	75.1	15.2	1.5	
		Female	183.1	7.1	0.9	1.2	42.0	1,063.7	1,011.8	366.4	90.7	12.7	1.1	
		Total	129.0	6.1	0.5	0.7	22.2	612.0	696.8	291.0	82.9	13.9	1.2	
1999	Cases	Male	12,287	15	3	3	31	1,976	4,702	2,538	2,198	722	49	50
		Female	29,813	11	7	9	429	11,428	10,740	4,040	2,371	616	20	142
		Unspecified	41	0	0	0	0	12	7	3	1	1	0	17
		Total	42,141	26	10	12	460	13,416	15,449	6,581	4,570	1,339	69	209
	Rate	Male	81.4	8.7	0.4	0.3	3.0	186.7	446.3	237.0	86.4	17.5	2.2	
		Female	193.6	6.7	1.0	0.9	43.5	1,138.3	1,064.6	386.1	94.8	14.8	0.7	
		Total	138.2	7.7	0.7	0.6	22.7	650.6	749.1	310.8	90.6	16.2	1.4	
2000	Cases	Male	13,539	11	2	1	30	2,335	5,013	2,786	2,366	875	45	75
		Female	32,868	9	6	6	474	12,454	11,993	4,365	2,692	708	29	132
		Unspecified	32	0	0	0	0	4	9	5	1	1	0	12
		Total	46,439	20	8	7	504	14,793	17,015	7,156	5,059	1,584	74	219
	Rate	Male	88.9	6.4	0.3	0.1	2.9	219.4	470.4	260.6	94.2	20.6	2.0	
		Female	211.6	5.5	0.8	0.6	47.5	1,234.3	1,175.7	417.9	109.0	16.6	1.0	
		Total	150.9	6.0	0.6	0.3	24.6	713.5	815.7	338.5	101.5	18.6	1.4	
2001	Cases	Male	15,242	14	0	0	38	2,545	5,769	3,172	2,636	951	51	66
		Female	34,728	26	5	3	503	12,905	12,716	4,755	2,872	754	30	159
		Unspecified	107	0	0	0	1	28	42	16	7	1	0	12
		Total	50,077	40	5	3	542	15,478	18,527	7,943	5,515	1,706	81	237
	Rate	Male	99.2	8.2	0.0	0.0	3.6	233.8	534.5	301.3	107.2	21.8	2.2	
		Female	221.8	16.0	0.7	0.3	49.6	1,255.1	1,233.4	465.7	118.8	17.1	1.0	
		Total	161.4	12.0	0.4	0.1	26.1	731.2	877.9	383.1	113.1	19.4	1.6	

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
2002	Cases	Male	17,451	4	1	1	26	2,768	6,625	3,721	2,998	1,178	69	60
		Female	38,776	8	1	6	537	14,109	14,461	5,368	3,297	833	24	132
		Unspecified	39	0	0	0	1	2	7	4	1	0	0	24
		Total	56,266	12	2	7	564	16,879	21,093	9,093	6,296	2,011	93	216
	Rate	Male	112.3	2.4	0.1	0.1	2.4	253.2	602.6	349.6	123.6	26.2	2.9	
		Female	244.9	5.0	0.1	0.6	52.3	1,364.5	1,375.9	519.4	138.2	18.4	0.8	
		Total	179.4	3.7	0.1	0.4	26.8	793.5	980.9	433.4	130.8	22.3	1.7	
2003	Cases	Male	19,010	5	1	0	25	2,911	7,296	4,094	3,292	1,252	72	62
		Female	40,943	14	2	2	570	14,778	15,451	5,663	3,458	876	26	103
		Unspecified	30	0	0	0	1	3	4	3	3	4	0	12
		Total	59,983	19	3	2	596	17,692	22,751	9,760	6,753	2,132	98	177
	Rate	Male	121.2	3.0	0.1	0.0	2.3	267.0	651.1	380.3	138.3	27.1	2.9	
		Female	256.2	8.7	0.3	0.2	55.1	1,430.0	1,443.6	541.4	147.6	18.8	0.9	
		Total	189.4	5.8	0.2	0.1	28.1	833.0	1,038.4	459.8	143.0	23.0	1.8	
2004	Cases	Male	20,491	8	0	1	22	3,062	7,980	4,463	3,317	1,495	91	52
		Female	42,440	12	2	6	535	14,939	16,170	5,933	3,684	1,042	42	75
		Unspecified	40	0	0	0	0	5	11	9	1	2	0	12
		Total	62,971	20	2	7	557	18,006	24,161	10,405	7,002	2,539	133	139
	Rate	Male	129.5	4.7	0.0	0.1	2.0	280.9	702.1	408.3	142.0	31.7	3.6	
		Female	263.2	7.4	0.3	0.6	51.8	1,443.6	1,489.4	557.6	160.1	21.9	1.4	
		Total	197.1	6.0	0.1	0.4	26.3	847.4	1,087.3	482.4	151.0	26.8	2.4	

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada. (Source: Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1980-1990 revised intercensal, 1991-1995 final intercensal, 1996-1997 final postcensal, 1998-2000 revised postcensal, 2001-2002 final postcensal, 2003-2004 revised postcensal.)

[2] 2004 data are preliminary and changes are anticipated. Nunavut data are not available for 2004; rates are calculated excluding Nunavut from the Canadian population denominator.

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Center for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006

Note: Small variability may exist between data reported by the provinces/territories and the Public Health Agency of Canada. Provincial/territorial data are definitive should a discrepancy exist.

Table 1.2 Reported Genital Chlamydia Cases and Rates[1] in Canada by Province/Territory and Sex, 1991-2004[2]

Year			Province/Territory													
			Canada	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU[3]
1991	Cases	Male	8,835	74	22	395	0	3,311	2,592	1,213	903	0	0	53	272	
		Female	26,918	518	73	1,832	0	9,334	8,515	3,338	2,388	0	0	144	776	
		Total*	45,969	594	96	2,230	0	12,681	11,110	4,551	3,291	6,909	3,261	198	1,048	
	Rate	Male	63.6	25.5	34.2	87.5	0.0	95.2	50.3	220.5	180.8	0.0	0.0	350.3	850.1	
		Female	190.4	179.3	110.8	395.1	0.0	260.3	161.5	596.7	474.4	0.0	0.0	1,044.7	2,681.9	
		Total*	164.0	102.5	73.7	243.7	0.0	179.5	106.5	410.2	328.2	266.5	96.7	684.8	1,720.0	
1992	Cases	Male	10,811	32	43	325	230	2,737	2,905	865	594	1,431	1,386	46	217	
		Female	35,363	417	148	1,321	1,109	7,595	9,915	2,425	1,814	4,881	4,910	146	682	
		Total*	46,365	450	204	1,646	1,339	10,361	12,830	3,290	2,408	6,312	6,434	192	899	
	Rate	Male	76.9	11.0	66.5	71.7	62.0	78.1	55.6	156.7	118.8	107.8	80.1	290.8	662.5	
		Female	247.1	144.0	223.5	283.3	293.9	210.5	185.4	432.1	359.8	373.5	282.2	1,012.0	2,299.7	
		Total*	163.4	77.6	155.9	179.0	178.9	145.7	121.4	295.6	239.8	239.6	185.4	634.9	1,440.4	
1993	Cases	Male	10,621	51	24	324	179	2,513	3,504	859	644	1,190	1,051	36	246	
		Female	33,379	412	110	1,134	887	7,129	10,529	2,400	1,665	4,006	4,251	130	726	
		Total*	44,022	463	139	1,459	1,066	9,647	14,041	3,259	2,309	5,199	5,302	166	972	
	Rate	Male	74.7	17.6	36.7	71.3	48.1	71.2	66.4	154.9	128.5	88.4	59.0	225.0	738.0	
		Female	230.5	142.1	164.2	241.8	234.8	196.2	194.5	425.6	329.2	302.3	237.3	889.4	2,402.8	
		Total*	153.4	79.8	105.0	158.0	142.2	134.6	131.3	291.4	229.3	194.7	148.5	542.1	1,529.5	
1994	Cases	Male	10,006	60	22	392	174	2,043	3,257	815	665	1,164	1,126	37	251	
		Female	31,176	296	85	1,052	743	5,783	10,196	2,260	1,832	3,845	4,217	116	751	
		Total*	41,235	356	109	1,446	917	7,837	13,465	3,075	2,497	5,010	5,368	153	1,002	
	Rate	Male	69.6	20.9	33.3	86.1	46.7	57.5	61.0	146.3	132.3	85.4	61.4	235.8	734.8	
		Female	212.8	102.9	125.6	223.4	196.4	158.2	185.9	398.8	361.2	286.5	228.3	808.2	2,422.7	
		Total*	142.0	61.9	81.5	156.1	122.1	108.7	124.4	273.6	247.3	185.2	145.8	509.2	1,537.8	
1995	Cases	Male	9,085	45	27	282	164	1,759	2,931	782	612	1,167	1,057	34	225	
		Female	28,451	227	85	884	598	5,278	9,157	2,226	1,737	3,851	3,602	122	689	
		Total*	37,551	272	112	1,167	762	7,048	12,090	3,008	2,344	5,018	4,660	156	914	
	Rate	Male	62.5	15.9	40.6	61.9	44.0	49.3	54.2	139.6	121.3	84.6	56.1	210.9	645.0	
		Female	192.0	79.8	124.5	187.3	157.9	143.8	164.7	390.8	340.9	283.2	189.7	826.3	2,174.0	
		Total*	127.9	47.9	83.1	125.8	101.4	97.3	110.3	266.2	231.1	183.1	123.1	505.1	1,372.9	
1996	Cases	Male	8,317	60	34	200	168	1,640	2,578	598	659	1,183	917	39	241	
		Female	26,062	219	97	873	665	5,006	8,025	1,961	1,577	3,685	3,191	105	658	
		Total*	34,399	279	131	1,074	833	6,655	10,605	2,559	2,236	4,868	4,116	144	899	
	Rate	Male	56.6	21.5	50.6	43.8	44.9	45.7	47.1	106.3	129.9	84.5	47.4	234.1	681.1	
		Female	174.0	77.9	140.6	184.0	175.4	135.8	142.5	342.8	307.8	267.0	163.8	687.3	2,044.4	
		Total*	115.9	49.8	96.2	115.3	110.6	91.5	95.5	225.6	219.3	175.1	106.0	450.9	1,330.5	
1997	Cases	Male	8,714	57	39	241	191	1,608	2,807	601	716	1,101	1,002	34	317	
		Female	25,406	278	100	885	625	4,758	7,750	1,986	1,601	3,446	3,110	139	728	
		Total*	34,144	335	139	1,127	819	6,380	10,559	2,587	2,317	4,547	4,116	173	1,045	
	Rate	Male	58.7	20.7	57.8	52.6	51.0	44.6	50.6	106.6	140.8	77.0	50.8	202.4	894.0	
		Female	167.8	99.9	144.1	185.9	164.4	128.6	135.9	346.7	311.7	244.8	156.4	900.4	2,255.4	
		Total*	113.9	60.5	101.6	120.6	108.6	87.4	93.9	227.6	226.7	160.3	103.9	536.6	1,542.8	
1998	Cases	Male	11,041	81	34	271	224	1,9[illegible]	3,727	804	787	1,361	1,340	53	377	
		Female	27,956	294	110	938	735	5,268	8,724	2,148	1,612	3,834	3,422	124	747	
		Total*	39,034	375	144	1,216	959	7,264	12,458	2,954	2,399	5,195	4,769	177	1,124	
	Rate	Male	73.7	29.9	50.5	59.0	60.0	54.9	66.4	142.5	154.5	92.8	67.4	323.5	1,070.6	
		Female	183.1	107.0	158.1	196.6	193.4	142.0	151.2	374.4	312.8	266.2	170.3	819.1	2,315.2	
		Total*	129.0	68.8	105.2	129.9	127.3	99.2	109.4	259.6	234.1	178.7	119.3	561.5	1,665.7	

Year			Province/Territory													
			Canada	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU[3]
1999	Cases	Male	12,287	98	43	296	323	2,136	4,220	865	871	1,472	1,504	49	410	
		Female	29,813	335	105	1,055	813	5,813	9,030	2,102	1,785	3,944	3,895	127	809	
		Total*	42,141	433	148	1,364	1,136	7,968	13,256	2,967	2,656	5,416	5,402	176	1,219	
	Rate	Male	81.4	36.6	63.6	64.2	86.5	58.9	74.3	152.7	170.9	98.5	75.1	305.4	1,161.2	
		Female	193.6	122.8	149.9	220.3	213.4	156.1	154.6	365.0	346.0	269.1	192.2	847.2	2,485.3	
		Total*	138.2	80.1	107.6	145.1	150.6	108.4	115.0	259.7	259.0	183.0	134.1	567.0	1,796.4	
2000	Cases	Male	13,539	103	69	298	327	2,199	4,799	967	968	1,705	1,691	45	140	228
		Female	32,868	451	162	1,103	916	6,461	9,796	2,296	1,968	4,296	4,498	101	344	476
		Total*	46,439	554	231	1,405	1,243	8,678	14,603	3,263	2,936	6,001	6,191	146	484	704
	Rate	Male	88.9	38.7	101.8	64.6	87.5	60.4	83.3	170.2	190.8	112.3	83.9	285.3	662.6	1,591.2
		Female	211.6	166.4	230.4	229.7	240.2	172.9	165.5	397.4	382.4	288.2	220.1	682.1	1,739.4	3,636.4
		Total*	150.9	103.1	167.3	149.3	164.6	117.6	125.0	284.7	287.3	199.4	152.5	477.4	1,183.2	2,567.6
2001	Cases	Male	15,242	130	41	368	312	2,884	5,428	930	1,060	1,950	1,729	39	163	208
		Female	34,728	463	109	1,232	889	7,307	10,779	2,330	2,042	4,513	4,209	92	370	393
		Total*	50,077	593	150	1,603	1,202	10,214	16,217	3,261	3,170	6,463	5,938	132	533	601
	Rate	Male	99.2	50.5	61.5	80.6	84.2	79.1	92.3	162.9	213.1	126.2	85.4	254.6	772.6	1,417.6
		Female	221.8	174.8	155.8	258.8	234.4	194.9	179.1	401.4	406.2	298.5	204.9	621.2	1,876.0	2,922.4
		Total*	161.4	113.6	109.8	171.9	160.3	138.1	136.3	283.3	317.0	211.4	145.6	438.1	1,305.7	2,137.2
2002	Cases	Male	17,451	107	42	330	369	3,053	6,191	977	1,280	2,249	2,333	48	198	274
		Female	38,776	415	103	1,241	944	7,975	11,905	2,391	2,333	5,112	5,316	93	402	546
		Total*	56,266	522	145	1,574	1,313	11,055	18,101	3,371	3,613	7,361	7,650	141	600	820
	Rate	Male	112.3	41.9	62.9	72.1	99.6	83.1	103.5	170.5	258.6	142.8	114.3	314.3	923.6	1832.5
		Female	244.9	157.3	146.7	260.4	248.6	211.4	194.4	410.4	465.8	331.7	256.3	625.6	2,005.0	3,960.3
		Total*	179.4	100.5	105.9	168.4	175.0	148.5	149.6	291.7	362.8	236.2	185.9	467.9	1,446.2	2,853.3
2003	Cases	Male	19,010	119	52	382	408	3,421	6,737	1,112	1,345	2,481	2,501	53	179	220
		Female	40,943	523	134	1,162	974	8,774	12,335	2,576	2,404	5,421	5,631	127	367	515
		Total*	59,983	642	186	1,552	1,382	12,212	19,076	3,688	3,749	7,902	8,133	180	546	735
	Rate	Male	121.2	46.7	77.8	83.3	110.0	92.5	111.2	193.0	272.1	155.4	121.4	342.8	820.3	1,458.2
		Female	256.2	198.5	190.3	243.2	256.1	231.1	198.9	440.1	480.6	346.8	268.9	840.1	1,797.4	3,658.2
		Total*	189.4	123.8	135.5	165.8	184.0	163.0	155.6	317.5	377.0	250.1	195.8	588.7	1,292.6	2,520.1
2004	Cases	Male	20,491	162	56	396	390	3,615	7,384	1,390	1,297	2,741	2,783	70	207	N/A
		Female	42,440	622	142	1,194	958	9,214	13,024	2,804	2,372	5,597	6,014	126	373	N/A
		Total*	62,971	784	198	1,592	1,348	12,844	20,427	4,194	3,670	8,338	8,799	197	580	N/A
	Rate	Male	129.5	63.7	83.4	86.2	105.0	97.1	120.5	239.3	262.59	169.3	133.6	448.6	937.0	N/A
		Female	263.2	236.5	200.7	249.7	251.6	241.0	207.4	475.8	474.05	353.0	283.8	826.1	1,796.7	N/A
		Total*	187.1	151.6	143.6	169.8	179.2	170.2	164.6	358.4	369.1	260.2	209.4	638.5	1,353.5	N/A

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada. (Source: Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1980-1990 revised intercensal, 1991-1995 final intercensal, 1996-1997 final postcensal, 1998-2000 revised postcensal, 2001-2002 final postcensal, 2003-2004 revised postcensal.)

[2] 2004 data are preliminary and changes are anticipated. Nunavut data are not available for 2004; rates are calculated excluding Nunavut from the Canadian population denominator.

[3] Data prior to 2000 are not available because Nunavut became a Canadian territory in April 1999. Data for 1999 were included with NT.

* Total includes cases not specified for sex.

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.

Note: Small variability may exist between data reported by the provinces/territories and the Public Health Agency of Canada. Provincial/territorial data are definitive should a discrepancy exist.

Table 2.1 Reported Gonorrhea Cases and Rates[1] in Canada by Age Group and Sex, 1980-2004[2]

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
1980	Cases	Male	32,555	10	0	6	43	3,921	10,821	7,505	6,542	2,241	173	1,293
		Female	20,485	18	36	34	193	6,075	7,234	3,280	1,962	436	31	1,186
		Unspecified	231	0	0	0	0	1	0	1	0	0	0	229
		Total	53,271	28	36	40	236	9,997	18,055	10,786	8,504	2,677	204	2,708
	Rate	Male	266.6	5.3	0.0	0.6	4.3	317.8	884.1	678.2	355.9	89.4	12.0	
		Female	166.5	10.1	5.2	3.9	20.1	513.1	602.5	298.4	110.0	17.4	1.7	
		Total	217.3	7.7	2.5	2.2	12.0	413.5	744.7	489.0	234.8	53.4	6.3	
1981	Cases	Male	34,337	5	5	8	54	4,435	11,991	7,906	6,959	2,179	149	646
		Female	21,863	10	28	33	219	6,932	8,034	3,487	2,110	476	33	501
		Unspecified	130	0	0	0	0	2	3	2	1	0	0	122
		Total	56,330	15	33	41	273	11,369	20,028	11,395	9,070	2,655	182	1,269
	Rate	Male	278.0	2.7	0.7	0.9	5.4	366.2	959.2	700.1	366.1	85.8	10.0	
		Female	175.3	5.6	4.0	3.8	23.2	598.6	654.7	310.8	113.9	18.8	1.8	
		Total	227.0	4.1	2.3	2.3	14.1	479.9	808.5	506.2	241.6	52.3	5.4	
1982	Cases	Male	32,078	5	3	1	46	4,063	11,239	7,309	6,399	2,169	147	697
		Female	20,893	8	22	32	211	6,563	7,816	3,363	1,899	422	21	536
		Unspecified	101	0	0	0	0	0	3	2	0	0	0	96
		Total	53,072	13	25	33	257	10,626	19,058	10,674	8,298	2,591	168	1,329
	Rate	Male	256.8	2.6	0.4	0.1	4.7	345.9	890.9	627.9	326.1	84.4	9.6	
		Female	165.5	4.4	3.1	3.7	22.7	587.0	634.0	290.5	98.9	16.5	1.1	
		Total	211.3	3.5	1.7	1.8	13.4	463.5	764.0	459.8	213.8	50.5	4.8	
1983	Cases	Male	27,006	10	2	3	32	3,223	9,455	6,186	5,592	1,801	116	586
		Female	18,148	6	19	31	185	5,469	6,904	2,934	1,719	414	25	442
		Unspecified	111	0	0	0	0	0	5	0	0	2	0	104
		Total	45,265	16	21	34	217	8,692	16,364	9,120	7,311	2,217	141	1,132
	Rate	Male	214.2	5.3	0.3	0.3	3.3	286.9	743.2	518.7	277.7	69.0	7.4	
		Female	142.3	3.3	2.7	3.5	20.1	512.4	558.9	247.7	86.9	16.0	1.2	
		Total	178.4	4.3	1.4	1.9	11.5	396.7	652.6	383.7	183.1	42.6	3.9	
1984	Cases	Male	25,852	7	2	3	51	3,094	9,024	5,966	5,226	1,828	98	553
		Female	17,924	4	22	26	240	5,501	6,832	2,792	1,677	365	23	442
		Unspecified	98	0	0	0	0	4	2	0	1	0	0	91
		Total	43,874	11	24	29	291	8,599	15,858	8,758	6,904	2,193	121	1,086
	Rate	Male	203.2	3.7	0.3	0.3	5.3	288.2	704.9	491.8	252.6	69.0	6.1	
		Female	139.1	2.2	3.1	3.0	26.4	540.0	553.6	232.6	82.1	13.9	1.1	
		Total	171.3	3.0	1.6	1.6	15.6	410.9	630.7	362.9	168.0	41.5	3.3	
1985	Cases	Male	23,277	8	1	4	41	2,804	8,545	5,091	4,484	1,522	88	689
		Female	17,399	5	19	26	207	5,448	6,445	2,666	1,598	349	18	618
		Unspecified	61	0	0	0	0	2	3	1	0	0	0	55
		Total	40,737	13	20	30	248	8,254	14,993	7,758	6,082	1,871	106	1,362
	Rate	Male	181.4	4.2	0.1	0.4	4.4	270.5	670.4	413.9	210.6	56.5	5.4	
		Female	133.7	2.8	2.6	2.9	23.0	554.9	526.6	220.2	75.8	13.1	0.8	
		Total	157.6	3.5	1.4	1.7	13.5	409.0	600.1	317.9	143.5	34.9	2.8	
1986	Cases	Male	19,458	7	1	6	34	2,715	7,042	4,542	3,413	1,164	100	434
		Female	15,744	7	23	21	227	5,128	5,690	2,513	1,394	320	28	393
		Unspecified	85	0	0	0	0	0	0	3	1	0	0	81
		Total	35,287	14	24	27	261	7,843	12,732	7,058	4,808	1,484	128	908
	Rate	Male	150.2	3.7	0.1	0.6	3.7	266.0	563.5	362.5	156.3	42.3	5.9	
		Female	119.7	3.9	3.2	2.4	25.6	530.3	475.6	205.1	64.3	11.7	1.3	
		Total	135.2	3.8	1.6	1.5	14.4	394.6	520.5	284.8	110.5	27.1	3.3	

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
1987	Cases	Male	14,755	3	7	4	35	2,288	5,361	3,307	2,447	897	74	332
		Female	12,923	6	18	30	195	4,357	4,578	2,017	1,084	298	17	323
		Unspecified	240	0	0	0	0	1	0	0	0	0	0	239
		Total	27,918	9	25	34	230	6,646	9,939	5,324	3,531	1,195	91	894
	Rate	Male	112.4	1.6	0.9	0.4	3.8	227.7	443.5	259.2	109.6	31.6	4.3	
		Female	97.0	3.3	2.5	3.3	21.9	456.9	396.5	162.5	48.9	10.6	0.8	
		Total	105.6	2.4	1.7	1.8	12.6	339.3	420.6	211.5	79.4	21.2	2.3	
1988	Cases	Male	10,381	2	1	4	26	1,558	3,604	2,395	1,840	667	48	236
		Female	9,501	5	11	25	139	3,209	3,293	1,531	828	220	14	226
		Unspecified	220	0	0	0	0	0	0	0	0	0	0	220
		Total	20,102	7	12	29	165	4,767	6,897	3,926	2,668	887	62	682
	Rate	Male	78.1	1.1	0.1	0.4	2.8	156.2	312.5	185.3	80.5	22.8	2.7	
		Female	70.3	2.8	1.5	2.7	15.5	338.7	298.2	121.7	36.4	7.6	0.6	
		Total	75.0	1.9	0.8	1.5	9.0	245.1	305.5	153.9	58.5	15.2	1.5	
1989	Cases	Male	10,278	7	1	2	26	1,503	3,355	2,345	2,009	735	54	241
		Female	8,778	3	22	18	144	3,083	2,850	1,445	822	221	10	160
		Unspecified	54	0	1	0	0	1	3	2	2	0	0	45
		Total	19,110	10	24	20	170	4,587	6,208	3,792	2,833	956	64	446
	Rate	Male	76.0	3.6	0.1	0.2	2.7	151.1	301.4	178.5	85.1	24.3	3.0	
		Female	63.8	1.6	3.0	1.9	15.9	326.2	265.7	113.0	35.1	7.4	0.4	
		Total	70.0	2.6	1.6	1.1	9.2	236.4	284.0	146.2	60.2	15.9	1.5	
1990	Cases	Male	7,681	5	1	3	21	1,140	2,373	1,791	1,553	553	57	184
		Female	6,024	9	13	9	139	2,168	1,911	918	564	176	10	107
		Unspecified	117	1	0	0	0	3	7	1	4	0	0	101
		Total	13,822	15	14	12	160	3,311	4,291	2,710	2,121	729	67	392
	Rate	Male	55.9	2.4	0.1	0.3	2.2	114.6	219.5	136.9	64.2	17.8	3.0	
		Female	43.1	4.6	1.7	1.0	15.2	229.8	183.2	72.0	23.4	5.7	0.4	
		Total	49.9	3.7	0.9	0.6	8.5	170.8	202.0	104.9	44.0	11.8	1.6	
1991	Cases	Male	7,086	4	0	0	22	576	1,141	897	831	344	41	3,230
		Female	5,352	2	12	3	109	1,082	958	454	319	93	5	2,315
		Unspecified	19	0	0	0	0	0	1	0	0	0	0	18
		Total	12,457	6	12	3	131	1,658	2,100	1,351	1,150	437	46	5,563
	Rate	Male	51.0	1.9	0.0	0.0	2.3	58.1	107.4	70.6	33.6	10.7	2.1	
		Female	37.9	1.0	1.6	0.3	11.8	115.5	93.4	36.7	13.0	2.9	0.2	
		Total	44.4	1.5	0.8	0.2	6.9	86.0	100.6	53.9	23.3	6.8	1.0	
1992	Cases	Male	5,148	8	0	1	19	781	1,485	1,175	1,138	428	51	62
		Female	4,093	7	9	6	140	1,644	1,195	582	381	85	12	32
		Unspecified	12	0	0	0	0	2	2	4	1	1	0	2
		Total	9,253	15	9	7	159	2,427	2,682	1,761	1,520	514	63	96
	Rate	Male	36.6	3.9	0.0	0.1	1.9	78.8	140.8	95.5	45.3	13.0	2.6	
		Female	28.6	3.6	1.2	0.6	14.9	175.4	117.5	48.4	15.2	2.6	0.5	
		Total	32.6	3.7	0.6	0.4	8.2	125.9	129.5	72.4	30.3	7.8	1.4	
1993	Cases	Male	3,738	1	1	3	8	596	1,013	884	845	323	26	38
		Female	3,086	0	11	3	88	1,185	997	402	298	79	4	19
		Unspecified	8	0	0	1	1	2	0	0	0	0	1	3
		Total	6,832	1	12	7	97	1,783	2,010	1,286	1,143	402	31	60
	Rate	Male	26.3	0.5	0.1	0.3	0.8	59.9	96.9	74.6	33.0	9.5	1.3	
		Female	21.3	0.0	1.4	0.3	9.2	126.0	99.1	34.8	11.7	2.3	0.2	
		Total	23.8	0.3	0.7	0.4	5.0	92.2	98.0	54.9	22.4	5.9	0.7	

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
1994	Cases	Male	3,478	3	0	1	10	433	796	821	971	386	34	23
		Female	2,645	1	4	3	83	947	817	363	293	92	7	35
		Unspecified	44	0	0	0	0	2	2	1	4	0	0	35
		Total	6,167	4	4	4	93	1,382	1,615	1,185	1,268	478	41	93
	Rate	Male	24.2	1.5	0.0	0.1	1.0	43.0	76.9	71.9	37.3	11.0	1.7	
		Female	18.1	0.5	0.5	0.3	8.6	99.5	82.0	32.6	11.4	2.6	0.3	
		Total	21.2	1.0	0.2	0.2	4.7	70.5	79.5	52.5	24.5	6.8	0.9	
1995	Cases	Male	3,322	3	2	0	9	425	769	710	980	360	36	28
		Female	2,385	1	4	2	75	888	761	347	243	51	1	12
		Unspecified	8	0	0	0	0	2	0	2	1	1	0	2
		Total	5,715	4	6	2	84	1,315	1,530	1,059	1,224	412	37	42
	Rate	Male	22.9	1.5	0.2	0.0	0.9	41.7	74.8	63.9	37.4	10.0	1.7	
		Female	16.1	0.5	0.5	0.2	7.7	92.2	76.9	32.0	9.4	1.4	0.0	
		Total	19.5	1.0	0.4	0.1	4.2	66.3	75.8	48.3	23.5	5.7	0.8	
1996	Cases	Male	2,845	1	2	1	5	345	688	614	820	320	26	23
		Female	2,168	2	3	2	64	844	652	320	210	60	2	9
		Unspecified	10	0	0	0	0	0	1	0	4	0	0	5
		Total	5,023	3	5	3	69	1,189	1,341	934	1,034	380	28	37
	Rate	Male	19.4	0.5	0.2	0.1	0.5	33.3	67.2	56.1	31.3	8.6	1.2	
		Female	14.5	1.1	0.4	0.2	6.5	86.3	66.1	29.9	8.1	1.6	0.1	
		Total	16.9	0.8	0.3	0.1	3.4	59.1	66.7	43.2	19.9	5.1	0.6	
1997	Cases	Male	2,646	0	0	0	2	333	599	570	765	337	23	17
		Female	1,822	0	0	2	56	716	578	235	184	42	4	5
		Unspecified	9	0	0	0	0	0	2	0	2	0	1	4
		Total	4,477	0	0	2	58	1,049	1,179	805	951	379	28	26
	Rate	Male	17.8	0.0	0.0	0.0	0.2	31.9	58.1	52.5	29.3	8.7	1.1	
		Female	12.0	0.0	0.0	0.2	5.7	72.5	58.2	22.1	7.2	1.1	0.1	
		Total	14.9	0.0	0.0	0.1	2.9	51.7	58.3	37.5	18.4	4.9	0.6	
1998	Cases	Male	2,921	0	0	3	5	327	665	571	898	406	32	14
		Female	1,938	3	5	3	51	799	575	245	196	53	5	3
		Unspecified	9	0	0	0	0	0	2	0	0	0	0	7
		Total	4,868	3	5	6	56	1,126	1,242	816	1,094	459	37	24
	Rate	Male	19.5	0.0	0.0	0.3	0.5	31.1	64.0	53.0	34.9	10.2	1.5	
		Female	12.7	1.8	0.7	0.3	5.2	80.2	57.7	23.3	7.7	1.3	0.2	
		Total	16.1	0.9	0.3	0.3	2.8	55.0	61.0	38.3	21.4	5.7	0.7	
1999	Cases	Male	3,322	1	0	1	2	337	737	597	1,077	518	45	7
		Female	2,054	0	4	5	49	798	636	293	193	71	2	3
		Unspecified	5	0	0	0	0	1	0	0	1	0	0	3
		Total	5,381	1	4	6	51	1,136	1,373	890	1,271	589	47	13
	Rate	Male	22.0	0.6	0.0	0.1	0.2	31.8	70.0	55.7	42.4	12.6	2.0	
		Female	13.3	0.0	0.6	0.5	5.0	79.5	63.0	28.0	7.7	1.7	0.1	
		Total	17.6	0.3	0.3	0.3	2.5	55.1	66.6	42.0	25.2	7.1	0.9	
2000	Cases	Male	3,829	1	1	0	6	432	824	656	1,246	612	46	5
		Female	2,353	1	1	0	47	969	732	300	223	71	6	3
		Unspecified	7	0	0	0	0	1	0	0	0	3	0	3
		Total	6,189	2	2	0	53	1,402	1,556	956	1,469	686	52	11
	Rate	Male	25.1	0.6	0.1	0.0	0.6	40.6	77.3	61.4	49.6	14.4	2.0	
		Female	15.1	0.6	0.1	0.0	4.7	96.0	71.8	28.7	9.0	1.7	0.2	
		Total	20.1	0.6	0.1	0.0	2.6	67.6	74.6	45.2	29.5	8.0	1.0	

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
2001	Cases	Male	4,176	0	0	0	4	467	980	740	1,224	704	53	4
		Female	2,571	3	0	3	58	1,007	852	310	236	96	4	2
		Unspecified	9	0	0	0	0	2	2	1	3	0	0	1
		Total	6,756	3	0	3	62	1,476	1,834	1,051	1,463	800	57	7
	Rate	Male	27.2	0.0	0.0	0.0	0.4	42.9	90.8	70.3	49.8	16.1	2.3	
		Female	16.4	1.9	0.0	0.3	5.7	97.9	82.6	30.4	9.8	2.2	0.1	
		Total	21.8	0.9	0.0	0.1	3.0	69.7	86.9	50.7	30.0	9.1	1.1	
2002	Cases	Male	4,589	0	0	0	8	472	1,122	814	1,341	767	60	5
		Female	2,770	2	2	3	62	1,049	872	374	301	97	4	4
		Unspecified	6	0	0	0	0	0	1	0	2	1	0	2
		Total	7,365	2	2	3	70	1,521	1,995	1,188	1,644	865	64	11
	Rate	Male	29.5	0.0	0.0	0.0	0.7	43.2	102.1	76.5	55.3	17.1	2.5	
		Female	17.5	1.3	0.3	0.3	6.0	101.5	83.0	36.2	12.6	2.1	0.1	
		Total	23.5	0.6	0.1	0.2	3.3	71.5	92.8	56.6	34.2	9.6	1.2	
2003	Cases	Male	5,025	0	0	0	5	535	1,242	890	1,362	906	73	12
		Female	3,210	1	2	0	59	1,225	1,032	418	346	117	7	3
		Unspecified	6	0	0	0	0	1	1	0	1	0	1	2
		Total	8,241	1	2	0	64	1,761	2,275	1,308	1,709	1,023	81	17
	Rate	Male	32.0	0.0	0.0	0.0	0.5	49.1	110.8	82.7	57.2	19.6	3.0	
		Female	20.1	0.6	0.3	0.0	5.7	118.5	96.4	40.0	14.8	2.5	0.2	
		Total	26.0	0.3	0.1	0.0	3.0	82.9	103.8	61.6	36.2	11.1	1.5	
2004	Cases	Male	5,818	0	0	0	7	625	1,449	1,011	1,521	1,102	95	8
		Female	3,410	1	0	1	68	1,311	1,093	465	334	131	5	1
		Unspecified	5	0	0	0	0	0	0	3	0	0	0	2
		Total	9,233	1	0	1	75	1,936	2,542	1,479	1,855	1,233	100	11
	Rate	Male	36.8	0.0	0.0	0.0	0.6	57.3	127.5	92.5	65.1	23.3	3.8	
		Female	21.1	0.6	0.0	0.1	6.6	126.7	100.7	43.7	14.5	2.8	0.2	
		Total	28.9	0.3	0.0	0.1	3.5	91.1	114.4	68.6	40.0	13.0	1.8	

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada. (Source: Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1980-1990 revised intercensal, 1991-1995 final intercensal, 1996-1997 final postcensal, 1998-2000 revised postcensal, 2001-2002 final postcensal, 2003-2004 revised postcensal.)

[2] 2004 data are preliminary and changes are anticipated. Nunavut data are not available for 2004; rates are calculated excluding Nunavut from the Canadian population denominator.

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.

Note: Small variability may exist between data reported by the provinces/territories and the Public Health Agency of Canada. Provincial/territorial data are definitive should a discrepancy exist.

Table 2.2 Reported Gonorrhea Cases and Rates[1] in Canada by Province/Territory and Sex, 1980-2004[2]

Year			Province/Territory													
			Canada	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU[3]
1980	Cases	Male	32,555	476	0	692	222	2,645	9,953	2,253	1,692	7,025	6,470	215	912	
		Female	20,485	276	0	753	101	1,936	6,093	1,831	909	4,451	3,513	128	494	
		Total*	53,271	792	108	1,528	323	4,581	16,046	4,084	2,601	11,476	9,983	343	1,406	
	Rate	Male	266.6	164.5	0.0	163.2	63.0	82.1	229.9	439.5	347.4	625.7	471.3	1,663.8	3,737.4	
		Female	166.5	97.5	0.0	175.5	28.6	58.9	138.0	350.7	189.2	416.1	256.4	1,122.1	2,256.3	
		Total*	217.3	138.3	87.3	179.2	45.7	70.4	183.5	394.7	268.9	523.4	363.9	1,409.8	3,037.0	
1981	Cases	Male	34,337	485	0	635	165	3,540	10,549	2,617	1,704	7,234	5,939	291	1,178	
		Female	21,863	307	0	668	98	2,690	6,651	2,054	991	4,453	3,168	158	625	
		Total*	56,330	813	92	1,320	263	6,230	17,200	4,671	2,695	11,687	9,107	449	1,803	
	Rate	Male	278.0	167.2	0.0	149.8	46.9	109.4	242.1	510.5	347.2	614.7	420.6	2,300.0	4,705.4	
		Female	175.3	107.8	0.0	155.1	27.7	81.3	149.3	392.2	204.3	398.5	224.4	1,404.3	2,775.3	
		Total*	227.0	141.4	74.3	154.4	37.2	95.1	195.2	450.7	276.2	509.4	322.5	1,878.4	3,791.4	
1982	Cases	Male	32,078	496	0	631	106	3,251	10,013	2,575	1,577	6,717	5,403	150	1,159	
		Female	20,893	257	0	626	84	2,372	6,371	2,033	889	4,349	3,223	108	581	
		Total*	53,072	777	59	1,275	190	5,623	16,384	4,608	2,466	11,066	8,626	258	1,740	
	Rate	Male	256.8	171.3	0.0	147.9	30.0	100.0	227.0	487.1	317.9	554.6	376.5	1,158.9	4,443.8	
		Female	165.5	90.2	0.0	144.5	23.6	71.3	141.2	384.5	181.0	375.9	224.2	936.8	2,479.3	
		Total*	211.3	135.2	47.6	148.3	26.8	85.5	183.6	440.2	249.8	467.3	300.3	1,054.3	3,514.1	
1983	Cases	Male	27,006	394	0	564	61	3,542	9,412	2,152	1,295	4,623	3,774	89	1,100	
		Female	18,148	279	0	594	59	2,360	6,183	1,609	734	3,398	2,315	58	559	
		Total*	45,265	685	87	1,170	120	5,902	15,595	3,761	2,029	8,021	6,089	147	1,659	
	Rate	Male	214.2	135.1	0.0	130.8	17.1	108.6	210.5	409.7	257.5	379.3	260.3	713.0	4,090.6	
		Female	142.3	96.9	0.0	135.6	16.4	70.6	135.3	300.3	147.1	290.1	159.1	520.9	2,316.3	
		Total*	178.4	118.2	69.4	134.6	16.8	89.4	172.5	354.5	202.5	335.6	209.6	622.4	3,251.4	
1984	Cases	Male	25,852	383	0	643	139	4,197	9,119	1,897	1,198	3,897	3,334	114	931	
		Female	17,924	218	0	684	115	2,793	6,554	1,453	614	2,815	2,131	77	470	
		Total*	43,874	617	67	1,342	254	6,990	15,673	3,350	1,812	6,712	5,465	191	1,401	
	Rate	Male	203.2	131.3	0.0	147.8	38.8	128.2	201.1	357.4	235.2	320.7	227.0	902.5	3,358.9	
		Female	139.1	75.6	0.0	154.7	31.7	83.2	141.3	268.5	121.3	239.6	144.3	882.5	1,891.6	
		Total*	171.3	106.3	52.9	153.0	35.2	105.4	170.9	312.5	178.4	280.8	185.5	798.7	2,665.3	
1985	Cases	Male	23,277	357	0	506	243	3,749	8,462	1,813	1,209	3,175	2,819	115	829	
		Female	17,399	201	0	677	264	2,678	6,445	1,373	689	2,515	2,103	76	378	
		Total*	40,737	568	49	1,185	507	6,427	14,907	3,186	1,898	5,690	4,922	191	1,207	
	Rate	Male	181.4	122.7	0.0	115.3	67.5	114.0	184.1	338.2	235.2	260.7	190.2	894.3	2,888.3	
		Female	133.7	69.7	0.0	151.7	72.5	79.3	137.1	251.4	134.7	212.3	140.9	660.6	1,470.8	
		Total*	157.6	98.0	38.4	133.9	70.1	96.4	160.3	294.4	185.1	236.8	165.5	784.0	2,218.7	
1986	Cases	Male	19,458	250	0	389	263	3,322	6,872	1,715	1,073	2,588	1,984	118	884	
		Female	15,744	171	0	563	241	2,522	5,771	1,314	664	2,294	1,586	68	550	
		Total*	35,287	435	67	952	506	5,844	12,643	3,029	1,737	4,882	3,570	186	1,436	
	Rate	Male	150.2	86.5	0.0	88.2	73.0	100.4	147.3	317.0	208.2	210.7	132.7	913.9	3,061.7	
		Female	119.7	59.5	0.0	125.6	66.0	74.2	121.0	238.6	129.2	190.8	105.1	5,787.8	2,129.9	
		Total*	135.2	75.5	52.2	107.0	69.8	87.1	134.0	277.5	168.8	200.8	118.8	759.8	2,625.4	
1987	Cases	Male	14,755	152	13	251	268	1,973	5,077	1,585	968	2,158	1,565	68	677	
		Female	12,923	102	20	356	203	1,697	4,596	1,306	816	1,949	1,355	57	466	
		Total*	27,918	258	39	609	471	3,897	9,673	2,891	1,784	4,107	2,920	125	1,144	
	Rate	Male	112.4	52.7	20.3	56.7	74.1	59.0	106.5	291.3	187.4	175.4	103.0	502.3	2,332.6	
		Female	97.0	35.6	30.9	78.9	55.4	49.4	94.3	235.8	158.1	161.7	88.5	468.4	1,791.3	
		Total*	105.6	44.9	30.3	68.2	64.7	57.5	100.3	263.3	172.7	168.6	95.7	486.2	2,078.6	
1988	Cases	Male	10,381	89	10	197	104	1,342	4,149	1,115	669	1,285	1,119	62	240	
		Female	9,501	59	13	346	139	1,227	3,680	903	601	1,272	1,015	38	208	
		Total*	20,102	151	23	543	243	2,785	7,829	2,018	1,270	2,557	2,135	100	448	
	Rate	Male	78.1	30.9	15.6	44.4	28.7	39.8	85.3	204.1	130.2	103.7	72.1	443.0	818.0	
		Female	70.3	20.6	20.0	76.3	37.8	35.4	73.9	162.5	116.8	104.7	64.9	301.0	789.2	
		Total*	75.0	26.3	17.8	60.5	33.3	40.7	79.5	183.1	123.5	104.2	68.5	375.6	804.4	

Year			Province/Territory													
			Canada	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU[1]
1989	Cases	Male	10,278	41	5	156	61	948	5,169	819	551	1,015	781	62	670	
		Female	8,778	37	10	295	87	694	4,081	721	449	962	712	35	695	
		Total*	19,110	80	15	451	148	1,694	9,250	1,540	1,000	1,977	1,493	97	1,365	
	Rate	Male	76.0	14.2	7.8	34.9	16.7	27.8	103.4	149.7	108.3	80.6	49.0	435.5	2,232.7	
		Female	63.8	12.9	15.2	64.5	23.5	19.7	79.8	129.6	87.9	77.8	44.4	271.7	2,572.5	
		Total*	70.0	13.9	11.5	49.9	20.1	24.4	91.5	139.6	98.1	79.2	46.7	357.7	2,393.7	
1990	Cases	Male	7,681	27	6	120	36	1,182	3,569	571	448	625	818	48	231	
		Female	6,024	22	3	190	26	695	2,552	508	455	630	682	37	224	
		Total*	13,822	49	10	310	62	1,966	6,148	1,079	903	1,255	1,500	85	455	
	Rate	Male	55.9	9.3	9.3	26.7	9.8	34.3	70.1	104.2	89.2	48.6	49.9	329.7	746.0	
		Female	43.1	7.6	4.6	41.3	7.0	19.6	49.0	91.1	90.1	49.9	41.3	279.9	801.7	
		Total*	49.9	8.5	7.7	34.1	8.4	28.1	59.7	97.6	89.7	49.3	45.6	306.0	772.4	
1991	Cases	Male	7,086	10	3	105	32	953	3,100	697	442	757	744	44	199	
		Female	5,352	15	3	189	21	417	2,274	598	404	630	584	33	184	
		Total*	12,457	25	6	294	53	1,380	5,381	1,295	846	1,387	1,330	77	383	
	Rate	Male	51.0	3.4	4.7	23.3	8.7	27.4	60.2	126.7	88.5	57.9	44.2	290.8	622.0	
		Female	37.9	5.2	4.6	40.8	5.6	11.6	43.1	106.9	80.3	49.0	34.5	239.4	635.9	
		Total*	44.4	4.3	4.6	32.1	7.1	19.5	51.6	116.7	84.4	53.5	39.4	266.3	628.6	
1992	Cases	Male	5,148	9	2	69	15	618	2,188	702	360	598	456	8	123	
		Female	4,093	4	1	126	9	264	1,707	557	357	576	336	5	151	
		Total*	9,253	13	3	196	24	891	3,897	1,259	717	1,174	792	13	274	
	Rate	Male	36.6	3.1	3.1	15.2	4.0	17.6	41.9	127.2	72.0	45.0	26.4	50.6	375.5	
		Female	28.6	1.4	1.5	27.0	2.4	7.3	31.9	99.3	70.8	44.1	19.3	34.7	509.2	
		Total*	32.6	2.2	2.3	21.3	3.2	12.5	36.9	113.1	71.4	44.6	22.8	43.0	439.0	
1993	Cases	Male	3,738	2	0	29	6	458	1,691	487	247	427	312	9	70	
		Female	3,086	1	0	61	2	217	1,341	436	243	404	254	14	113	
		Total*	6,832	3	0	90	8	680	3,035	923	490	831	566	23	183	
	Rate	Male	26.3	0.7	0.0	6.4	1.6	13.0	32.0	87.8	49.3	31.7	17.5	56.2	210.0	
		Female	21.3	0.3	0.0	13.0	0.5	6.0	24.8	77.3	48.1	30.5	14.2	95.8	374.0	
		Total*	23.8	0.5	0.0	9.7	1.1	9.5	28.4	82.5	48.7	31.1	15.8	75.1	288.0	
1994	Cases	Male	3,478	1	0	13	6	504	1,760	394	188	266	298	7	41	
		Female	2,645	2	0	22	7	225	1,328	335	189	240	189	6	102	
		Total*	6,167	3	0	35	13	735	3,123	729	377	506	490	13	143	
	Rate	Male	24.2	0.3	0.0	2.9	1.6	14.2	32.9	70.7	37.4	19.5	16.2	44.6	120.0	
		Female	18.1	0.7	0.0	4.7	1.9	6.2	24.2	59.1	37.3	17.9	10.2	41.8	329.0	
		Total*	21.2	0.5	0.0	3.8	1.7	10.2	28.8	64.9	37.3	18.7	13.3	43.3	219.5	
1995	Cases	Male	3,322	2	0	15	7	425	1,719	376	208	223	296	11	40	
		Female	2,385	2	0	23	7	165	1,264	282	178	177	193	9	85	
		Total*	5,715	4	0	38	14	595	2,983	658	386	400	492	20	125	
	Rate	Male	22.9	0.7	0.0	3.3	1.9	11.9	31.8	67.1	41.2	16.2	15.7	68.2	114.7	
		Female	16.1	0.7	0.0	4.9	1.8	4.5	22.7	49.5	34.9	13.0	10.2	61.0	268.2	
		Total*	19.5	0.7	0.0	4.1	1.9	8.2	27.2	58.2	38.1	14.6	13.0	64.8	187.8	
1996	Cases	Male	2,845	2	1	30	10	325	1,304	305	216	247	354	3	48	
		Female	2,168	0	0	67	31	144	1,008	249	188	225	172	7	77	
		Total*	5,023	2	1	97	41	478	2,312	554	404	472	527	10	125	
	Rate	Male	19.4	0.7	1.5	6.6	2.7	9.1	23.8	54.2	42.6	17.6	18.3	18.0	135.7	
		Female	14.5	0.0	0.0	14.1	8.2	3.9	17.9	43.5	36.7	16.3	8.8	45.8	239.2	
		Total*	16.9	0.4	0.7	10.4	5.4	6.6	20.8	48.8	39.6	17.0	13.6	31.3	185.0	
1997	Cases	Male	2,646	2	1	33	4	402	1,147	249	176	218	344	0	70	
		Female	1,822	1	0	75	11	136	783	269	166	188	113	0	80	
		Total*	4,477	3	1	108	15	545	1,931	518	342	406	458	0	150	
	Rate	Male	17.8	0.7	1.5	7.2	1.1	11.2	20.7	44.2	34.6	15.2	17.4	0.0	197.4	
		Female	12.0	0.4	0.0	15.8	2.9	3.7	13.7	47.0	32.3	13.4	5.7	0.0	247.8	
		Total*	14.9	0.5	0.7	11.6	2.0	7.5	17.2	45.6	33.5	14.3	11.6	0.0	221.5	

Year			Province/Territory													
			Canada	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU[3]
1998	Cases	Male	2,921	2	1	29	7	370	1,355	225	167	268	406	5	86	
		Female	1,938	0	0	55	10	112	917	198	159	250	163	6	68	
		Total*	4,868	2	1	84	17	490	2,272	424	326	518	569	11	154	
	Rate[1]	Male	19.5	0.7	1.5	6.3	1.9	10.2	24.1	39.9	32.8	18.3	20.4	30.5	244.2	
		Female	12.7	0.0	0.0	11.5	2.6	3.0	15.9	34.5	30.9	17.4	8.1	39.6	210.8	
		Total*	16.1	0.4	0.7	9.0	2.3	6.7	20.0	37.3	31.8	17.8	14.2	34.9	228.2	
1999	Cases	Male	3,322	1	0	23	6	485	1,319	245	167	287	683	5	101	
		Female	2,054	0	0	39	5	136	911	265	135	248	205	10	100	
		Total*	5,381	1	0	63	11	623	2,230	510	302	535	890	15	201	
	Rate	Male	22.0	0.4	0.0	5.0	1.6	13.4	23.2	43.2	32.8	19.2	34.1	31.2	286.1	
		Female	13.3	0.0	0.0	8.1	1.3	3.7	15.6	46.0	26.2	16.9	10.1	66.7	307.2	
		Total*	17.6	0.2	0.0	6.7	1.5	8.5	19.4	44.6	29.4	18.1	22.1	48.3	296.2	
2000	Cases	Male	3,829	4	0	32	10	538	1,674	353	235	343	528	3	63	46
		Female	2,353	1	0	25	1	126	1,120	305	230	243	179	2	72	49
		Total*	6,189	5	0	57	11	670	2,794	658	465	586	708	5	135	95
	Rate	Male	25.1	1.5	0.0	6.9	2.7	14.8	29.0	62.1	46.3	22.6	26.2	19.0	298.2	321.0
		Female	15.1	0.4	0.0	5.2	0.3	3.4	18.9	52.8	44.7	16.3	8.8	13.5	364.1	374.3
		Total*	20.1	0.9	0.0	6.1	1.5	9.1	23.9	57.4	45.5	19.5	17.4	16.3	330.0	346.5
2001	Cases	Male	4,176	0	0	46	7	665	1,809	360	252	473	450	2	73	39
		Female	2,571	0	0	39	5	163	1,151	340	276	328	153	1	78	37
		Total*	6,756	0	0	86	12	832	2,960	701	531	801	603	3	151	76
	Rate	Male	27.2	0.0	0.0	10.1	1.9	18.2	30.8	63.1	50.7	30.6	22.2	13.1	346.0	265.8
		Female	16.4	0.0	0.0	8.2	1.3	4.3	19.1	58.6	54.9	21.7	7.4	6.8	395.5	275.1
		Total*	21.8	0.0	0.0	9.2	1.6	11.2	24.9	60.9	53.1	26.2	14.8	10.0	369.9	270.3
2002	Cases	Male	4,589	5	0	92	13	669	1,954	321	268	563	597	8	66	33
		Female	2,770	5	0	107	17	205	1,194	316	291	415	116	3	58	44
		Total*	7,365	9	0	199	30	878	3,150	637	559	978	713	11	124	77
	Rate	Male	29.5	2.0	0.0	20.1	3.5	18.2	32.7	56.0	54.1	35.7	29.3	52.4	307.9	220.7
		Female	17.5	1.5	0.0	22.4	4.5	5.4	19.5	54.2	58.1	26.9	5.6	20.2	289.3	319.1
		Total*	23.5	1.7	0.0	21.3	4.0	11.8	26.0	55.1	56.1	31.4	17.3	36.5	298.9	267.9
2003	Cases	Male	5,025	7	0	55	15	663	2,381	419	239	602	506	1	110	27
		Female	3,210	0	0	63	19	205	1,409	464	305	433	181	2	91	38
		Total*	8,241	7	0	118	34	872	3,791	883	544	1,035	688	3	201	65
	Rate	Male	32.0	2.7	0.0	12.0	4.0	17.9	39.3	72.7	48.4	37.7	24.6	6.5	504.1	179.0
		Female	20.1	0.0	0.0	13.2	5.0	5.4	22.7	79.3	61.0	27.7	8.6	13.2	445.7	269.9
		Total*	26.0	1.4	0.0	12.6	4.5	11.6	30.9	76.0	54.7	32.8	16.6	9.8	475.9	222.9
2004	Cases	Male	5,818	1	1	53	6	680	2,471	545	263	867	833	22	76	N/A
		Female	3,410	0	3	69	7	147	1,484	543	374	508	195	20	60	N/A
		Total*	9,233	1	4	122	13	827	3,959	1,088	637	1,376	1,028	42	136	N/A
	Rate	Male	36.8	0.4	1.5	11.5	1.6	18.3	40.3	93.8	53.2	53.5	40.0	141.0	344.0	N/A
		Female	21.1	0.0	4.2	14.4	1.8	3.8	23.6	92.2	74.7	32.0	9.2	131.1	289.0	N/A
		Total*	28.9	0.2	2.9	13.0	1.7	11.0	31.9	93.0	64.1	42.9	24.5	136.1	317.4	N/A

[1] Rate per 100,000 population. Population estimates provided by Statistics Canada. (Source: Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1980-1990 revised intercensal, 1991-1995 final intercensal, 1996-1997 final postcensal, 1998-2000 revised postcensal, 2001-2002 final postcensal, 2003-2004 revised postcensal.)

[2] 2004 data are preliminary and changes are anticipated. Nunavut data are not available for 2004; rates are calculated excluding Nunavut from the Canadian population denominator.

[3] Data prior to 2000 are not available because Nunavut became a Canadian territory in April 1999. Data for 1999 were included with NT.

* Total includes cases not specified for sex.

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.

Note: Small variability may exist between data reported by the provinces/territories and the Public Health Agency of Canada. Provincial/territorial data are definitive should a discrepancy exist.

Table 3.1 Reported Infectious Syphilis[1] Cases and Rates[2] in Canada by Age Group and Sex, 1993-2004[3]

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
1993	Cases	Male	97	0	0	0	0	2	14	16	30	29	6	0
		Female	76	1	0	0	0	13	24	10	15	7	6	0
		Unspecified	4	0	0	0	0	1	0	0	1	1	0	1
		Total	177	1	0	0	0	16	38	26	46	37	12	1
	Rate	Male	0.7	0.0	0.0	0.0	0.0	0.2	1.3	1.4	1.2	0.9	0.3	
		Female	0.5	0.5	0.0	0.0	0.0	1.4	2.4	0.9	0.6	0.2	0.2	
		Total	0.6	0.3	0.0	0.0	0.0	0.8	1.9	1.1	0.9	0.5	0.3	
1994	Cases	Male	112	0	0	0	0	3	15	19	31	32	12	0
		Female	71	0	0	0	0	9	17	14	15	11	5	0
		Unspecified	5	0	0	0	0	0	1	1	1	0	1	1
		Total	188	0	0	0	0	12	33	34	47	43	18	1
	Rate	Male	0.8	0.0	0.0	0.0	0.0	0.3	1.4	1.7	1.2	0.9	0.6	
		Female	0.5	0.0	0.0	0.0	0.0	0.9	1.7	1.3	0.6	0.3	0.2	
		Total	0.6	0.0	0.0	0.0	0.0	0.6	1.6	1.5	0.9	0.6	0.4	
1995	Cases	Male	95	0	0	0	0	1	16	13	31	27	6	1
		Female	52	0	0	0	0	9	11	10	14	8	0	0
		Unspecified	0	0	0	0	0	0	0	0	0	0	0	0
		Total	147	0	0	0	0	10	27	23	45	35	6	1
	Rate	Male	0.7	0.0	0.0	0.0	0.0	0.1	1.6	1.2	1.2	0.7	0.3	
		Female	0.4	0.0	0.0	0.0	0.0	0.9	1.1	0.9	0.5	0.2	0.0	
		Total	0.5	0.0	0.0	0.0	0.0	0.5	1.3	1.0	0.9	0.5	0.1	
1996	Cases	Male	74	0	0	0	0	3	7	12	28	20	3	1
		Female	45	0	0	0	0	6	8	12	12	5	2	0
		Unspecified	0	0	0	0	0	0	0	0	0	0	0	0
		Total	119	0	0	0	0	9	15	24	40	25	5	1
	Rate	Male	0.5	0.0	0.0	0.0	0.0	0.3	0.7	1.1	1.1	0.5	0.1	
		Female	0.3	0.0	0.0	0.0	0.0	0.6	0.8	1.1	0.5	0.1	0.1	
		Total	0.4	0.0	0.0	0.0	0.0	0.4	0.7	1.1	0.8	0.3	0.1	
1997	Cases	Male	65	0	0	0	0	1	3	8	26	26	1	0
		Female	50	0	0	0	0	3	8	13	17	8	1	0
		Unspecified	0	0	0	0	0	0	0	0	0	0	0	0
		Total	115	0	0	0	0	4	11	21	43	34	2	0
	Rate	Male	0.4	0.0	0.0	0.0	0.0	0.1	0.3	0.7	1.0	0.7	0.0	
		Female	0.3	0.0	0.0	0.0	0.0	0.3	0.8	1.2	0.7	0.2	0.0	
		Total	0.4	0.0	0.0	0.0	0.0	0.2	0.5	1.0	0.8	0.4	0.0	
1998	Cases	Male	110	0	0	0	0	2	4	13	41	39	11	0
		Female	67	0	0	0	0	6	8	10	26	14	3	0
		Unspecified	0	0	0	0	0	0	0	0	0	0	0	0
		Total	177	0	0	0	0	8	12	23	67	53	14	0
	Rate	Male	0.7	0.0	0.0	0.0	0.0	0.2	0.4	1.2	1.6	1.0	0.5	
		Female	0.4	0.0	0.0	0.0	0.0	0.6	0.8	0.9	1.0	0.3	0.1	
		Total	0.6	0.0	0.0	0.0	0.0	0.4	0.6	1.1	1.3	0.7	0.3	
1999	Cases	Male	113	0	0	0	0	1	13	11	36	41	11	0
		Female	78	0	0	0	0	8	12	14	19	22	3	0
		Unspecified	0	0	0	0	0	0	0	0	0	0	0	0
		Total	191	0	0	0	0	9	25	25	55	63	14	0
	Rate	Male	0.7	0.0	0.0	0.0	0.0	0.1	1.2	1.0	1.4	1.0	0.5	
		Female	0.5	0.0	0.0	0.0	0.0	0.8	1.2	1.3	0.8	0.5	0.1	
		Total	0.6	0.0	0.0	0.0	0.0	0.4	1.2	1.2	1.1	0.8	0.3	

Year			Age Group (years)											
			Canada	0<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+	NS
2000	Cases	Male	114	0	0	0	0	0	3	12	44	44	11	0
		Female	60	0	0	0	0	5	9	8	23	13	2	0
		Unspecified	0	0	0	0	0	0	0	0	0	0	0	0
		Total	174	0	0	0	0	5	12	20	67	57	13	0
	Rate	Male	0.7	0.0	0.0	0.0	0.0	0.0	0.3	1.1	1.8	1.0	0.5	
		Female	0.4	0.0	0.0	0.0	0.0	0.5	0.9	0.8	0.9	0.3	0.1	
		Total	0.6	0.0	0.0	0.0	0.0	0.2	0.6	0.9	1.3	0.7	0.3	
2001	Cases	Male	184	0	0	0	0	4	21	20	62	60	16	1
		Female	103	0	0	0	0	10	25	21	23	22	2	0
		Unspecified	0	0	0	0	0	0	0	0	0	0	0	0
		Total	287	0	0	0	0	14	46	41	85	82	18	1
	Rate	Male	1.2	0.0	0.0	0.0	0.0	0.4	1.9	1.9	2.5	1.4	0.7	
		Female	0.7	0.0	0.0	0.0	0.0	1.0	2.4	2.1	1.0	0.5	0.1	
		Total	0.9	0.0	0.0	0.0	0.0	0.7	2.2	2.0	1.7	0.9	0.3	
2002	Cases	Male	386	0	0	0	0	6	21	31	170	146	12	0
		Female	95	0	0	0	0	6	24	27	23	14	1	0
		Unspecified	1	0	0	0	0	0	0	0	1	0	0	0
		Total	482	0	0	0	0	12	45	58	194	160	13	0
	Rate	Male	2.5	0.0	0.0	0.0	0.0	0.5	1.9	2.9	7.0	3.2	0.5	
		Female	0.6	0.0	0.0	0.0	0.0	0.6	2.3	2.6	1.0	0.3	0.0	
		Total	1.5	0.0	0.0	0.0	0.0	0.6	2.1	2.8	4.0	1.8	0.2	
2003	Cases	Male	758	0	0	0	0	8	32	80	298	307	33	0
		Female	148	0	0	0	0	12	35	34	40	23	4	0
		Unspecified	2	0	0	0	0	0	1	1	0	0	0	0
		Total	908	0	0	0	0	20	68	115	338	330	37	0
	Rate	Male	4.8	0.0	0.0	0.0	0.0	0.7	2.9	7.4	12.5	6.7	1.4	
		Female	0.9	0.0	0.0	0.0	0.0	1.2	3.3	3.3	1.7	0.5	0.1	
		Total	2.9	0.0	0.0	0.0	0.0	0.9	3.1	5.4	7.2	3.6	0.7	
2004	Cases	Male	997	0	0	0	0	7	53	82	339	474	41	1
		Female	129	0	0	0	0	8	30	32	27	28	4	0
		Unspecified	1	0	0	0	0	0	0	0	0	0	0	1
		Total	1,127	0	0	0	0	15	83	114	366	502	45	2
	Rate	Male	6.3	0.0	0.0	0.0	0.0	0.6	4.7	7.5	14.5	10.0	1.6	
		Female	0.8	0.0	0.0	0.0	0.0	0.8	2.8	3.0	1.2	0.6	0.1	
		Total	3.5	0.0	0.0	0.0	0.0	0.7	3.7	5.3	7.9	5.3	0.8	

[1] Infectious syphilis: early symptomatic (primary and secondary) syphilis + early latent stages.

[2] Rate per 100,000 population. Population estimates provided by Statistics Canada. (Source: Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1980-1990 revised intercensal, 1991-1995 final intercensal, 1996-1997 final postcensal, 1998-2000 revised postcensal, 2001-2002 final postcensal, 2003-2004 revised postcensal.)

[3] 2004 data are preliminary and changes are anticipated. Nunavut data are not available for 2004; rates are calculated excluding Nunavut from the Canadian population denominator.

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.

Note: Small variability may exist between data reported by the provinces/territories and the Public Health Agency of Canada. Provincial/territorial data are definitive should a discrepancy exist.

Table 3.2 Reported Inectious Syphilis[1] Cases and Rates[2] in Canada by Province/Territory and Sex, 1993-2004[3]

Year			Province/Territory													
			Canada	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU[4]
1993	Cases	Male	97	0	0	6	0	11	58	2	3	5	12	0	0	
		Female	76	0	0	9	0	6	53	1	2	1	4	0	0	
		Total*	177	0	0	15	0	17	115	3	5	6	16	0	0	
	Rate	Male	0.7	0.0	0.0	1.3	0.0	0.3	1.1	0.4	0.6	0.4	0.7	0.0	0.0	
		Female	0.5	0.0	0.0	1.9	0.0	0.2	1.0	0.2	0.4	0.1	0.2	0.0	0.0	
		Total*	0.6	0.0	0.0	1.6	0.0	0.2	1.1	0.3	0.5	0.2	0.4	0.0	0.0	
1994	Cases	Male	112	0	0	11	2	16	55	3	11	5	9	0	0	
		Female	71	1	1	13	2	4	35	1	7	3	3	1	0	
		Total*	188	1	1	24	4	20	93	4	18	8	14	1	0	
	Rate	Male	0.8	0.0	0.0	2.4	0.5	0.5	1.0	0.5	2.2	0.4	0.5	0.0	0.0	
		Female	0.5	0.3	1.5	2.8	0.5	0.1	0.6	0.2	1.4	0.2	0.2	7.0	0.0	
		Total*	0.6	0.2	0.7	2.6	0.5	0.3	0.9	0.4	1.8	0.3	0.4	3.3	0.0	
1995	Cases	Male	95	1	0	1	1	6	58	3	9	3	13	0	0	
		Female	52	0	0	0	0	8	28	1	10	1	4	0	0	
		Total*	147	1	0	1	1	14	86	4	19	4	17	0	0	
	Rate	Male	0.7	0.4	0.0	0.2	0.3	0.2	1.1	0.5	1.8	0.2	0.7	0.0	0.0	
		Female	0.4	0.0	0.0	0.0	0.0	0.2	0.5	0.2	2.0	0.1	0.2	0.0	0.0	
		Total*	0.5	0.2	0.0	0.1	0.1	0.2	0.8	0.4	1.9	0.1	0.4	0.0	0.0	
1996	Cases	Male	74	0	0	1	0	10	41	1	4	1	16	0	0	
		Female	45	0	0	2	0	2	32	0	5	0	4	0	0	
		Total*	119	0	0	3	0	12	73	1	9	1	20	0	0	
	Rate	Male	0.5	0.0	0.0	0.2	0.0	0.3	0.7	0.2	0.8	0.1	0.8	0.0	0.0	
		Female	0.3	0.0	0.0	0.4	0.0	0.1	0.6	0.0	1.0	0.0	0.2	0.0	0.0	
		Total*	0.4	0.0	0.0	0.3	0.0	0.2	0.7	0.1	0.9	0.0	0.5	0.0	0.0	
1997	Cases	Male	65	0	0	0	0	4	28	0	1	3	29	0	0	
		Female	50	0	0	1	0	3	21	0	1	4	20	0	0	
		Total*	115	0	0	1	0	7	49	0	2	7	49	0	0	
	Rate	Male	0.4	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.2	0.2	1.5	0.0	0.0	
		Female	0.3	0.0	0.0	0.2	0.0	0.1	0.4	0.0	0.2	0.3	1.0	0.0	0.0	
		Total*	0.4	0.0	0.0	0.1	0.0	0.1	0.4	0.0	0.2	0.2	1.2	0.0	0.0	
1998	Cases	Male	110	0	0	1	0	2	25	2	4	6	70	0	0	
		Female	67	0	0	1	0	2	16	1	2	0	45	0	0	
		Total*	177	0	0	2	0	4	41	3	6	6	115	0	0	
	Rate	Male	0.7	0.0	0.0	0.2	0.0	0.1	0.4	0.4	0.8	0.4	3.5	0.0	0.0	
		Female	0.4	0.0	0.0	0.2	0.0	0.1	0.3	0.2	0.4	0.0	2.2	0.0	0.0	
		Total*	0.6	0.0	0.0	0.2	0.0	0.1	0.4	0.3	0.6	0.2	2.9	0.0	0.0	
1999	Cases	Male	113	0	0	1	0	2	37	0	0	2	71	0	0	
		Female	78	0	0	0	0	2	17	0	1	0	58	0	0	
		Total*	191	0	0	1	0	4	54	0	1	2	129	0	0	
	Rate	Male	0.7	0.0	0.0	0.2	0.0	0.1	0.7	0.0	0.0	0.1	3.5	0.0	0.0	
		Female	0.5	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.2	0.0	2.9	0.0	0.0	
		Total*	0.6	0.0	0.0	0.1	0.0	0.1	0.5	0.0	0.1	0.1	3.2	0.0	0.0	
2000	Cases	Male	114	0	0	0	0	5	29	0	1	13	59	7	0	0
		Female	60	0	0	1	0	2	14	1	0	2	35	4	0	0
		Total*	174	0	0	1	0	7	43	1	1	15	95	11	0	0
	Rate	Male	0.7	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.2	0.9	2.9	44.4	0.0	0.0
		Female	0.4	0.0	0.0	0.2	0.0	0.1	0.2	0.2	0.0	0.1	1.8	27.0	0.0	0.0
		Total*	0.6	0.0	0.0	0.1	0.0	0.1	0.4	0.1	0.1	0.5	2.3	36.0	0.0	0.0
2001	Cases	Male	184	0	0	0	0	15	37	1	2	13	103	13	0	0
		Female	103	1	0	0	0	0	9	0	1	7	76	9	0	0
		Total*	287	1	0	0	0	15	46	1	3	20	179	22	0	0
	Rate	Male	1.2	0.0	0.0	0.0	0.0	0.4	0.6	0.2	0.4	0.8	5.1	84.9	0.0	0.0
		Female	0.7	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.5	3.7	60.8	0.0	0.0
		Total*	0.9	0.2	0.0	0.0	0.0	0.2	0.4	0.1	0.3	0.7	4.4	73.0	0.0	0.0

Year			Province/Territory													
			Canada	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NU[4]
2002	Cases	Male	386	0	0	1	1	47	207	4	0	9	113	4	0	0
		Female	95	0	0	0	1	0	12	2	1	5	72	2	0	0
		Total*	482	0	0	1	2	47	219	6	1	14	186	6	0	0
	Rate	Male	2.5	0.0	0.0	0.2	0.3	1.3	3.5	0.7	0.0	0.6	5.5	26.2	0.0	0.0
		Female	0.6	0.0	0.0	0.0	0.3	0.0	0.2	0.3	0.2	0.3	3.5	13.5	0.0	0.0
		Total*	1.5	0.0	0.0	0.1	0.3	0.6	1.8	0.5	0.1	0.4	4.5	19.9	0.0	0.0
2003	Cases	Male	758	1	0	10	3	148	362	21	5	33	172	3	0	0
		Female	148	0	0	0	1	5	24	16	1	9	89	2	1	0
		Total*	908	1	0	10	4	154	386	37	6	42	262	5	1	0
	Rate	Male	4.8	0.4	0.0	2.2	0.8	4.0	6.0	3.6	1.0	2.1	8.3	19.4	0.0	0.0
		Female	0.9	0.0	0.0	0.0	0.3	0.1	0.4	2.7	0.2	0.6	4.3	13.2	4.9	0.0
		Total*	2.9	0.2	0.0	1.1	0.5	2.1	3.1	3.2	0.6	1.3	6.3	16.4	2.4	0.0
2004	Cases	Male	997	0	0	13	3	220	458	17	1	58	226	1	0	N/A
		Female	129	0	0	0	1	14	14	6	0	16	78	0	0	N/A
		Total*	1,127	0	9	13	4	235	472	23	1	74	304	1	0	N/A
	Rate	Male	6.3	0.0	0.0	2.8	0.8	5.9	7.5	2.9	0.2	3.6	10.9	6.4	0.0	N/A
		Female	0.8	0.0	0.0	0.0	0.3	0.4	0.2	1.0	0.0	1.0	3.7	0.0	0.0	N/A
		Total*	3.5	0.0	0.0	1.4	0.5	3.1	3.8	2.0	0.1	2.3	7.2	3.2	0.0	N/A

[1] Infectious syphilis: early symptomatic (primary and secondary) syphilis + early latent stages.

[2] Rate per 100,000 population. Population estimates provided by Statistics Canada. (Source: Statistics Canada, Demography Division, Demographic Estimates Section, July Population Estimates, 1980-1990 revised intercensal, 1991-1995 final intercensal, 1996-1997 final postcensal, 1998-2000 revised postcensal, 2001-2002 final postcensal, 2003-2004 revised postcensal.)

[3] 2004 data are preliminary and changes are anticipated. Nunavut data are not available for 2004; rates are calculated excluding Nunavut from the Canadian population denominator.

[4] Data prior to 2000 are not available because Nunavut became a Canadian territory in April 1999. Data for 1999 were included with NT.

* Total includes cases not specified for sex.

Source: Surveillance and Epidemiology Section, Community Acquired Infections Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.

Note: Small variability may exist between data reported by the provinces/territories and the Public Health Agency of Canada. Provincial/territorial data are definitive should a discrepancy exist.

APPENDIX II

Yukon
Northwest Territories
Nunavut
British Columbia
Alberta
Saskatchewan
Manitoba
Ontario
Quebec
Newfoundland and Labrador
Prince Edward Island
Nova Scotia
New Brunswick